Tidal and Lunar Data for Point Mugu, San Nicolas Island, and the Barking Sands Area During 1995

by
Charles Fisk
and
Bernard Cohenour
Geophysics Analysis Section

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NAVAL AIR WARFARE CENTER

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NAVAL AIR WARFARE CENTER WEAPONS DIVISION

FOREWORD

This publication combines a single source for all tidal and lunar data for operational locations of the Naval Air Warfare Center for use in Calendar Year 1995.

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13. ABSTRACT *(Maximum 200 words)*
Basic lunar and tidal data for Point Mugu, San Nicolas Island and the Barking Sands area during 1995 are provided. The data presented are: (1) Tidal data; (2) times of moonrise and moonset; (3) times of lunar phases; and (4) times of sunrise and sunset.

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Tables: (Contd.)

INTRODUCTION

This publication combines a single source for all tidal and lunar data for operational locations of the Naval Air Warfare Center Weapons Division for use in Calendar Year 1995.

The data presentations are in two main divisions: one for Point Mugu and San Nicolas Island, and the other for the Barking Sands area. Within each division, the times of moonrise and moonset and tidal data are given. Appendixes provide information on lunar phases, sunrise and sunset times and calculation of the tide at any time. This publication is issued annually. Information regarding this data may be obtained from the Geophysics Branch of the Pacific Ranges and Facilities Department.

Special tidal data requests (ranges, heights at any time, and/or graphical depictions of each) for Point Mugu, San Nicolas Island, and Barking Sands, as well as for other locations, can be made by contacting the authors of this report at the Naval Air Warfare Center Weapons Division (805) 989-8383.

DATA SOURCE AND TIME REFERENCES

The data given here have been prepared from information contained in Tide Tables for the West Coast of North and South America including the Hawaiian Islands, 1995, published by the National Ocean Service.

For Point Mugu and San Nicolas Island, all times listed are Pacific Standard Time (PST), add eight hours to obtain Universal Coordinated Time (UCT or Z). When Daylight Savings Time (PDT) is in effect, one hour is to be added to the times given. In 1995, Pacific Daylight Time is scheduled to commence at 0200 PST on Sunday, 2 April, and to end at 0200 PDT on Sunday, 29 October.

For the Barking Sands Area, all times listed are Alaska-Hawaii Standard Time (AHST); add ten hours to obtain UCT. Daylight Savings Time is not observed in Hawaii.

TIDAL DATA

The ranges of tidal heights that may be expected at Point Mugu and San Nicolas Island are shown in Table 1. The range of heights for the primary harbor in the Barking Sands area, Port Allen, is shown in Table 2. The times and height of high and low tides for 1995 at Point Mugu are given in Tables 4 through 15, and at San Nicolas Island in Tables 16 through 27. Similar tide data for Port Allen are given in Tables 29 through 40.

TABLE 1. Tidal Ranges for Point Mugu and San Nicolas Island

Point Mugu		
Tidal Levels	**Height (Ft)**	**Occurrence**
Extreme high water	6.84	0842, Dec 22
Mean tide level (mean sea level)	2.74	
Extreme low water	-1.67	1542, Jan 01
Tidal Ranges	**Height (Ft)**	**Occurrence(s)**
Maximum	8.48	Jan 01, Dec 22
Minimum	1.84	Sep 18
San Nicolas Island		
Tidal Levels	**Height (Ft)**	**Occurrence**
Extreme high water	6.27	0848, Dec 22
Mean tide level (mean sea level)	2.51	
Extreme low water	-1.53	1548, Jan 01
Tidal Ranges	**Height (Ft)**	**Occurrence(s)**
Maximum	7.77	Jan 01, Dec 22
Minimum	1.69	Sep 18

TABLE 2. Tidal Ranges for Port Allen

Tidal Levels	**Height (Ft)**
Extreme high water	2.3
Mean higher high water	1.6
Mean high water	1.0
Mean tide level (mean sea level)	0.7
Mean low water	0.5
Mean lower low water	-0.1
Extreme low water	-0.3

These tables list the times and heights of high and low tide for each month of the year and chronologically through each day. The heights are all measured from mean lower low water and are values for a sea unaffected by wind waves or swell. The height and character of the sea surface are influenced by factors other than the predictable positions of the moon and sun, and thus are likely to be higher or lower than computed values indicate.

LUNAR DATA

Times of moonrise and moonset for the Point Mugu-San Nicolas Island area in 1995 are given in Table 3, and for the Barking Sands area in Table 28, preceding the tidal data for the respective stations. Information regarding the phases of the moon in 1995 is found in Appendix B.

TABLE 3. Moonrise and Moonset, Point Mugu, 1995

Location: W119 07', N34 07'

Point Mugu, California
Rise and Set for the Moon for 1995

Astronomical Applications Dept.
U.S. Naval Observatory
Washington, D.C. 20392-5420

Pacific Standard Time

Day	Jan. Rise	Jan. Set	Feb. Rise	Feb. Set	Mar. Rise	Mar. Set	Apr. Rise	Apr. Set	May Rise	May Set	June Rise	June Set	July Rise	July Set	Aug. Rise	Aug. Set	Sept. Rise	Sept. Set	Oct. Rise	Oct. Set	Nov. Rise	Nov. Set	Dec. Rise	Dec. Set
01	0701	1744	0745	1943	0617	1827	0633	2006	0628	2039	0736	2138	0815	2129	1002	2150	1207	2248	1256	2341	1351	0045	1340	0141
02	0751	1852	0821	2043	0651	1927	0710	2101	0712	2128	0830	2216	0912	2203	1104	2229	1308	2344	1346		1427	0147	1415	0239
03	0835	1957	0854	2142	0725	2025	0749	2154	0759	2215	0925	2252	1009	2237	1207	2311	1406		1431	0045	1502	0247	1451	0336
04	0915	2100	0928	2238	0800	2122	0831	2245	0849	2258	1021	2327	1108	2311	1311	2359	1500	0044	1512	0149	1538	0347	1530	0432
05	0950	2200	1002	2334	0835	2217	0917	2333	0942	2338	1118		1209	2348	1414		1549	0148	1550	0252	1614	0445	1612	0527
06	1024	2259			0913	2311	1005		1036		1217	0001	1312		1517	0052	1634	0254	1627	0354	1652	0542	1656	0619
07	1056	2355	1116	0028	0953		1057	0019	1132	0016	1318	0035	1417	0029	1615	0152	1715	0400	1703	0456	1732	0639	1743	0709
08	1129		1158	0121	1036	0003	1150	0101	1230	0052	1422	0112	1523	0114	1709	0256	1753	0505	1739	0556	1815	0733	1833	0756
09	1203	0050	1242	0213	1123	0053	1246	0141	1329	0127	1528	0151	1629	0206	1758	0403	1830	0608	1816	0655	1900	0825	1924	0840
10	1240	0144	1331	0302	1213	0140	1344	0219	1431	0202	1636	0235	1732	0305	1841	0511	1906	0710	1855	0752	1948	0914	2017	0920
11	1319	0238	1423	0349	1307	0225	1445	0255	1535	0239	1744	0326	1830	0409	1921	0618	1943	0810	1936	0848	2039	0959	2111	0957
12	1402	0330	1519	0432	1403	0307	1547	0331	1642	0318	1850	0422	1922	0517	1959	0723	2020	0908	2020	0942	2131	1041	2205	1032
13	1449	0421	1616	0514	1501	0347	1651	0408	1751	0401	1951	0525	2008	0626	2035	0826	2100	1005	2107	1032	2224	1120	2300	1106
14	1539	0509	1716	0552	1601	0424	1758	0446	1901	0449	2046	0632	2049	0733	2110	0926	2142	1059	2156	1120	2319	1157	2357	1139
15	1633	0555	1816	0629	1703	0501	1906	0528	2008	0543	2134	0740	2127	0839	2146	1025	2227	1151	2247	1204		1232		1213
16	1729	0638	1918	0705	1806	0537	2015	0613	2110	0643	2216	0848	2203	0941	2224	1121	2314	1240	2340	1245	0014	1306	0056	1248
17	1827	0717	2021	0741	1911	0615	2122	0703	2207	0747	2254	0952	2237	1041	2304	1216		1326		1323	0112	1340	0157	1327
18	1926	0754	2125	0818	2018	0654	2225	0759	2256	0853	2329	1055	2312	1140	2347	1309	0004	1409	0035	1400	0211	1416	0301	1410
19	2026	0830	2229	0856	2124	0736	2323	0859	2339	0959		1154	2348	1236		1400	0057	1450	0131	1435	0313	1454	0407	1459
20	2127	0905	2334	0938	2231	0822		1002		1103	0003	1252		1331	0033	1447	0151	1528	0228	1510	0417	1536	0513	1555
21	2229	0940			2334	0912	0014	1106	0018	1204	0037	1348	0026	1425	0121	1532	0247	1604	0328	1546	0524	1623	0619	1657
22	2332	1016	0039	1116		1008	0059	1209	0054	1304	0111	1443	0107	1516	0213	1614	0345	1639	0430	1623	0632	1717	0720	1803
23		1055	0140	1212	0034	1107	0140	1310	0128	1401	0147	1538	0150	1606	0306	1654	0444	1715	0534	1703	0738	1816	0816	1913
24	0037	1138	0238	1312	0128	1209	0217	1410	0201	1458	0226	1630	0237	1653	0402	1731	0545	1751	0639	1748	0840	1920	0905	2021
25	0142	1226	0331	1415	0216	1312	0251	1509	0234	1554	0308	1721	0327	1736	0459	1807	0647	1829	0746	1837	0937	2026	0949	2128
26	0246	1320	0419	1520	0300	1414	0325	1606	0309	1648	0353	1810	0420	1817	0557	1841	0751	1910	0852	1932	1027	2132	1029	2232
27	0349	1419	0502	1624	0339	1516	0358	1703	0347	1742	0441	1855	0514	1855	0656	1916	0855	1955	0954	2031	1112	2238	1106	2334
28	0447	1523	0541	1726	0415	1616	0433	1759	0426	1835	0532	1938	0610	1931	0756	1952	1000	2045	1052	2134	1152	2341	1142	
29	0539	1629			0450	1715	0509	1854	0509	1925	0625	2017	0707	2006	0858	2030	1102	2140	1144	2238	1229		1217	0033
30	0626	1736			0524	1813	0547	1947	0556	2012	0720	2054	0804	2040	1000	2111	1201	2239	1231	2342	1305	0042	1253	0131
31	0707	1840			0558	1910			0645	2057			0903	2114	1103	2157			1312				1331	0227

Add one hour for daylight time, if and when in use.

TABLE 4. Point Mugu Tides, January 1995

January 1995

Mugu Lagoon (Ocean Piers), CA

34° 06.0' North, 119° 06.0' West

Tidal range, highs, and lows in feet.

Pacific Standard Time - Add one hour for Daylight Savings Time

Date	Range	Time	Ht	Time	Ht	Time	Ht	Time	Ht
01	8.48	0224	1.51	0824	6.81	1542	-1.67	2200	4.30
02	8.06	0312	1.47	0912	6.59	1624	-1.47	2242	4.38
03	7.24	0354	1.50	0954	6.15	1706	-1.09	2324	4.41
04	6.09	0454	1.61	1042	5.53	1748	-0.56		
05	4.74	0012	4.41	0548	1.77	1130	4.78	1824	0.04
06	3.73	0106	4.39	0654	1.91	1224	4.00	1906	0.66
07	3.14	0154	4.38	0824	1.93	1336	3.27	1954	1.25
08	2.73	0254	4.43	1006	1.70	1524	2.79	2048	1.74
09	3.29	0354	4.54	1130	1.25	1724	2.73	2154	2.08
10	3.96	0448	4.72	1230	0.76	1848	2.92	2306	2.25
11	4.57	0542	4.94	1306	0.38	1924	3.15	2354	2.17
12	5.17	0612	5.18	1342	0.01	2000	3.34		
13	5.69	0042	2.12	0648	5.41	1412	-0.28	2030	3.51
14	6.10	0118	2.02	0718	5.60	1442	-0.50	2054	3.66
15	6.37	0154	1.91	0754	5.73	1512	-0.64	2130	3.79
16	6.47	0224	1.81	0830	5.77	1536	-0.70	2154	3.91
17	6.37	0254	1.73	0854	5.71	1606	-0.66	2224	4.02
18	6.03	0336	1.68	0936	5.53	1636	-0.51	2254	4.12
19	5.46	0418	1.67	1012	5.20	1706	-0.25	2330	4.21
20	4.64	0506	1.69	1048	4.74	1736	0.10		
21	3.77	0006	4.31	0554	1.72	1130	4.16	1812	0.54
22	3.41	0048	4.42	0712	1.69	1230	3.51	1854	1.02
23	3.09	0142	4.57	0848	1.49	1406	2.96	1954	1.48
24	3.79	0248	4.79	1024	0.99	1612	2.79	2106	1.84
25	4.79	0354	5.11	1142	0.32	1754	3.02	2230	1.97
26	5.86	0506	5.51	1236	-0.34	1854	3.39	2342	1.88
27	6.81	0554	5.92	1324	-0.88	1942	3.76		
28	7.50	0042	1.65	0654	6.25	1406	-1.25	2024	4.08
29	7.82	0136	1.39	0742	6.42	1448	-1.40	2054	4.33
30	7.75	0218	1.16	0824	6.40	1524	-1.35	2136	4.51
31	7.29	0306	1.01	0900	6.17	1554	-1.11	2206	4.62

TABLE 5. Point Mugu Tides, February 1995

February 1995

Mugu Lagoon (Ocean Piers), CA

34° 06.0' North, 119° 06.0' West

Tidal range, highs, and lows in feet.

Pacific Standard Time - Add one hour for Daylight Savings Time

Date	Range	Time	Ht	Time	Ht	Time	Ht	Time	Ht
01	6.48	0348	0.97	0942	5.75	1636	-0.72	2242	4.65
02	5.40	0436	1.04	1024	5.18	1706	-0.22	2318	4.60
03	4.17	0524	1.20	1106	4.51	1742	0.34	2400	4.49
04	2.89	0618	1.40	1154	3.81	1812	0.92		
06	2.64	0142	4.23	0854	1.59	1430	2.63	1936	1.95
07	2.86	0248	4.18	1048	1.33	1706	2.57	2054	2.31
08	3.37	0354	4.27	1154	0.90	1836	2.83	2230	2.43
09	4.01	0454	4.49	1242	0.48	1918	3.11	2342	2.33
10	4.66	0554	4.77	1318	0.11	1936	3.35		
11	5.26	0030	2.12	0624	5.06	1348	-0.20	2000	3.58
12	5.74	0106	1.87	0700	5.32	1412	-0.42	2024	3.81
13	6.07	0142	1.60	0736	5.50	1442	-0.57	2048	4.04
14	6.20	0218	1.34	0818	5.58	1506	-0.62	2118	4.25
15	6.10	0248	1.11	0848	5.54	1536	-0.55	2148	4.45
16	5.72	0330	0.93	0924	5.35	1606	-0.37	2212	4.62
17	5.07	0406	0.81	1006	5.01	1636	-0.06	2248	4.74
18	4.45	0454	0.78	1048	4.51	1706	0.35	2324	4.80
19	3.09	0548	0.81	1136	3.91	1742	0.84		
20	3.92	0006	4.80	0654	0.88	1236	3.28	1824	1.36
21	3.93	0100	4.76	0824	0.84	1418	2.82	1924	1.84
22	4.21	0212	4.76	1006	0.55	1630	2.83	2054	2.16
23	4.81	0330	4.88	1124	0.07	1754	3.18	2236	2.13
24	5.55	0448	5.16	1218	-0.39	1848	3.59	2348	1.83
25	6.21	0554	5.47	1306	-0.74	1930	3.97		
26	6.63	0048	1.43	0648	5.71	1348	-0.92	1954	4.31
27	6.74	0136	1.03	0736	5.81	1424	-0.93	2036	4.58
28	6.53	0218	0.71	0818	5.74	1454	-0.79	2106	4.77

TABLE 7. Point Mugu Tides, April 1995

April 1995

Mugu Lagoon (Ocean Piers), CA

34° 06.0' North, 119° 06.0' West

Tidal range, highs, and lows in feet

Pacific Standard Time - Add one hour for Daylight Savings Time

Date	Ht	Time	Ht	Time	Ht	Time	Ht	Time	Ht
01	5.07	0354	-0.07	0954	4.09	1548	0.93	2148	4.99
02	4.80	0436	0.03	1036	3.72	1612	1.29	2212	4.83
03	4.39	0518	0.21	1118	3.33	1642	1.66	2242	4.60
04	3.88	0606	0.45	1218	2.98	1706	2.02	2318	4.33
05	2.05	0654	0.68	1342	2.73	1742	2.35		
06	3.21	0012	4.04	0818	0.83	1554	2.76	1854	2.64
07	2.97	0124	3.78	0942	0.81	1712	3.02	2118	2.68
08	3.02	0254	3.68	1048	0.66	1748	3.32	2248	2.37
09	3.31	0424	3.79	1130	0.48	1812	3.65	2342	1.91
10	3.69	0524	4.01	1212	0.33	1836	4.01		
11	4.19	0024	1.37	0612	4.25	1242	0.22	1854	4.41
12	4.65	0106	0.78	0654	4.45	1318	0.18	1918	4.83
13	5.02	0142	0.21	0736	4.57	1348	0.22	1948	5.23
14	5.86	0224	-0.31	0818	4.58	1424	0.35	2018	5.56
15	6.47	0306	-0.70	0912	4.46	1454	0.57	2054	5.77
16	6.77	0354	-0.94	0954	4.24	1536	0.88	2142	5.83
17	6.70	0442	-0.98	1054	3.93	1612	1.24	2224	5.72
18	6.29	0536	-0.86	1154	3.61	1654	1.63	2312	5.43
19	4.02	0636	-0.63	1312	3.39	1806	2.01		
20	5.40	0012	5.03	0748	-0.38	1442	3.39	1930	2.26
21	4.79	0130	4.60	0906	-0.19	1554	3.62	2112	2.20
22	4.38	0248	4.30	1012	-0.08	1654	3.97	2242	1.81
23	4.33	0418	4.19	1112	0.01	1742	4.34	2348	1.28
24	4.54	0524	4.19	1154	0.13	1818	4.67		
25	4.63	0042	0.76	0624	4.20	1242	0.30	1854	4.93
26	4.81	0124	0.31	0718	4.17	1318	0.51	1930	5.13
27	5.27	0206	-0.02	0754	4.09	1348	0.75	1954	5.25
28	5.55	0242	-0.25	0842	3.97	1418	1.00	2024	5.30
29	5.66	0312	-0.37	0918	3.82	1442	1.25	2048	5.29
30	5.60	0348	-0.40	0954	3.64	1512	1.50	2118	5.20

TABLE 6. Point Mugu Tides, March 1995

March 1995

Mugu Lagoon (Ocean Piers), CA

34° 06.0' North, 119° 06.0' West

Tidal range, highs, and lows in feet

Pacific Standard Time - Add one hour for Daylight Savings Time

Date	Ht	Time	Ht	Time	Ht	Time	Ht	Time	Ht
01	6.02	0254	0.49	0854	5.51	1530	-0.51	2136	4.87
02	5.27	0336	0.40	0930	5.13	1554	-0.13	2200	4.88
03	4.49	0418	0.43	1006	4.66	1630	0.31	2230	4.80
04	4.08	0454	0.57	1048	4.12	1654	0.79	2300	4.64
05	3.66	0542	0.78	1130	3.56	1724	1.28	2336	4.44
06	2.00	0636	1.02	1230	3.02	1748	1.74		
07	3.00	0024	4.21	0748	1.20	1354	2.60	1818	2.16
08	2.80	0118	3.99	0930	1.19	1648	2.59	1930	2.51
09	2.96	0242	3.90	1054	0.93	1812	2.88	2154	2.60
10	3.41	0412	4.01	1154	0.60	1842	3.17	2318	2.37
11	3.99	0512	4.27	1236	0.28	1906	3.46		
12	4.55	0012	2.02	0554	4.57	1306	0.02	1918	3.75
13	5.01	0048	1.61	0636	4.84	1336	-0.17	1942	4.06
14	5.33	0124	1.18	0712	5.05	1354	-0.28	2006	4.39
15	5.44	0154	0.76	0754	5.15	1430	-0.29	2030	4.70
16	5.32	0236	0.37	0836	5.13	1454	-0.19	2106	4.98
17	5.15	0318	0.07	0918	4.95	1530	0.03	2136	5.19
18	5.42	0354	-0.12	0954	4.63	1554	0.37	2212	5.30
19	5.46	0448	-0.18	1048	4.17	1636	0.78	2248	5.28
20	5.24	0542	-0.10	1148	3.66	1718	1.26	2336	5.14
21	3.14	0648	0.06	1254	3.19	1806	1.74		
22	4.74	0030	4.90	0806	0.17	1442	2.98	1918	2.15
23	4.56	0142	4.67	0936	0.11	1624	3.16	2106	2.29
24	4.68	0312	4.59	1054	-0.09	1730	3.54	2242	2.03
25	4.98	0436	4.69	1154	-0.29	1818	3.94	2354	1.56
26	5.26	0542	4.86	1242	-0.39	1854	4.31		
27	5.37	0048	1.06	0642	4.98	1318	-0.38	1930	4.62
28	5.26	0130	0.61	0724	4.99	1354	-0.26	1954	4.86
29	5.07	0212	0.27	0806	4.89	1424	-0.04	2030	5.02
30	5.06	0248	0.04	0848	4.70	1454	0.24	2054	5.10
31	5.16	0324	-0.07	0924	4.42	1518	0.57	2124	5.08

TABLE 8. Point Mugu Tides, May 1995

May 1995

Mugu Lagoon (Ocean Piers), CA

34° 06.0' North, 119° 06.0' West

Tidal range, highs, and lows in feet

Pacific Standard Time - Add one hour for Daylight Savings Time

Date	Range	Time	Ht	Time	Ht	Time	Ht	Time	Ht
01	5.40	0424	-0.34	1036	3.45	1542	1.75	2136	5.06
02	5.04	0454	-0.20	1118	3.26	1606	2.00	2212	4.84
03	4.58	0542	-0.01	1212	3.09	1642	2.26	2242	4.57
04	4.04	0630	0.21	1318	3.01	1724	2.51	2324	4.25
05	2.66	0724	0.41	1442	3.06	1836	2.70		
06	3.36	0024	3.91	0824	0.55	1548	3.27	2030	2.70
07	2.99	0142	3.62	0924	0.63	1636	3.57	2206	2.38
08	3.27	0318	3.49	1018	0.66	1712	3.93	2312	1.84
09	3.69	0436	3.53	1106	0.67	1742	4.36	2354	1.19
10	4.14	0542	3.68	1148	0.69	1812	4.83		
11	4.82	0048	0.49	0636	3.85	1224	0.74	1836	5.31
12	5.95	0130	-0.19	0724	3.99	1306	0.81	1912	5.76
13	6.89	0212	-0.79	0812	4.08	1348	0.93	1948	6.10
14	7.52	0254	-1.23	0906	4.09	1430	1.10	2030	6.30
15	7.77	0342	-1.47	0954	4.03	1512	1.30	2118	6.30
16	7.59	0436	-1.50	1054	3.92	1554	1.55	2206	6.09
17	7.03	0524	-1.34	1154	3.82	1654	1.82	2254	5.69
18	6.18	0624	-1.03	1306	3.79	1754	2.06	2354	5.15
19	4.52	0724	-0.64	1412	3.88	1924	2.18		
20	4.79	0106	4.56	0824	-0.23	1518	4.09	2054	2.05
21	4.23	0230	4.05	0924	0.14	1612	4.37	2230	1.66
22	4.20	0348	3.72	1024	0.47	1700	4.67	2336	1.15
23	4.18	0506	3.57	1118	0.76	1742	4.94		
24	4.50	0030	0.65	0612	3.54	1154	1.03	1818	5.15
25	5.08	0118	0.22	0706	3.54	1236	1.26	1854	5.31
26	5.51	0154	-0.10	0754	3.54	1312	1.47	1924	5.41
27	5.80	0230	-0.32	0842	3.53	1342	1.64	1954	5.47
28	5.95	0306	-0.46	0918	3.52	1412	1.78	2024	5.49
29	5.96	0336	-0.53	0954	3.49	1442	1.92	2054	5.44
30	5.84	0412	-0.51	1036	3.45	1518	2.05	2124	5.32
31	5.57	0442	-0.43	1112	3.41	1548	2.21	2148	5.14

TABLE 9. Point Mugu Tides, June 1995

June 1995

Mugu Lagoon (Ocean Piers), CA

34° 06.0' North, 119° 06.0' West

Tidal range, highs, and lows in feet

Pacific Standard Time - Add one hour for Daylight Savings Time

Date	Range	Time	Ht	Time	Ht	Time	Ht	Time	Ht
01	5.16	0518	-0.29	1154	3.38	1630	2.37	2224	4.88
02	4.64	0554	-0.09	1242	3.39	1718	2.52	2300	4.54
03	4.02	0642	0.14	1336	3.47	1818	2.63	2348	4.15
04	3.26	0724	0.38	1430	3.64	1942	2.60		
05	3.28	0054	3.73	0812	0.63	1518	3.92	2118	2.31
06	3.42	0218	3.38	0906	0.86	1606	4.29	2236	1.77
07	3.68	0354	3.20	0954	1.06	1648	4.73	2336	1.07
08	4.02	0518	3.25	1048	1.20	1724	5.23		
09	5.41	0030	0.32	0624	3.42	1142	1.31	1806	5.73
10	6.58	0118	-0.40	0724	3.63	1230	1.37	1842	6.18
11	7.52	0206	-1.01	0812	3.83	1318	1.42	1930	6.52
12	8.12	0248	-1.44	0900	3.98	1406	1.46	2012	6.68
13	8.29	0336	-1.66	0954	4.09	1454	1.52	2100	6.63
14	8.00	0424	-1.65	1048	4.15	1548	1.62	2154	6.36
15	7.30	0512	-1.42	1142	4.20	1648	1.76	2248	5.87
16	6.26	0554	-1.03	1236	4.25	1748	1.90	2342	5.23
17	4.86	0648	-0.53	1330	4.34	1906	1.99		
18	4.49	0042	4.52	0742	0.03	1430	4.46	2030	1.92
19	4.06	0154	3.85	0836	0.57	1530	4.63	2154	1.64
20	3.78	0324	3.36	0930	1.05	1618	4.83	2318	1.20
21	3.59	0448	3.15	1024	1.43	1700	5.02		
22	4.47	0018	0.74	0606	3.15	1118	1.71	1742	5.20
23	5.03	0106	0.33	0706	3.25	1206	1.90	1818	5.36
24	5.49	0148	0.01	0754	3.36	1242	2.01	1854	5.50
25	5.83	0218	-0.23	0842	3.46	1318	2.06	1930	5.60
26	6.06	0254	-0.39	0912	3.55	1354	2.08	2006	5.66
27	6.15	0324	-0.49	0948	3.62	1430	2.09	2036	5.67
28	6.10	0354	-0.51	1018	3.68	1454	2.12	2106	5.59
29	5.88	0424	-0.46	1048	3.73	1536	2.17	2136	5.42
30	5.49	0454	-0.33	1118	3.79	1618	2.24	2206	5.16

TABLE 10. Point Mugu Tides, July 1995

July 1995

Mugu Lagoon (Ocean Piers), CA

34° 06.0' North, 119° 06.0' West

Tidal range, highs, and lows in feet

Pacific Standard Time - Add one hour for Daylight Savings Time

Date	Range	Time	Ht	Time	Ht	Time	Ht	Time	Ht
01	4.93	0524	-0.13	1154	3.85	1654	2.31	2242	4.80
02	4.22	0554	0.14	1236	3.95	1754	2.35	2324	4.35
03	3.64	0636	0.46	1318	4.10	1906	2.32		
04	3.50	0018	3.84	0712	0.83	1412	4.33	2036	2.11
05	3.44	0142	3.34	0754	1.20	1506	4.63	2206	1.63
06	4.07	0324	3.03	0854	1.52	1554	5.03	2318	0.96
07	3.74	0506	3.04	1006	1.74	1654	5.48		
08	5.73	0018	0.23	0624	3.28	1112	1.83	1742	5.96
09	6.84	0106	-0.45	0724	3.59	1212	1.79	1836	6.39
10	7.69	0154	-1.00	0812	3.90	1306	1.68	1918	6.70
11	8.18	0236	-1.36	0848	4.16	1354	1.55	2006	6.82
12	8.22	0318	-1.49	0936	4.38	1448	1.45	2048	6.73
13	7.80	0406	-1.40	1018	4.54	1542	1.42	2136	6.40
14	6.97	0448	-1.11	1106	4.64	1636	1.47	2230	5.86
15	5.82	0524	-0.65	1154	4.69	1730	1.58	2318	5.18
16	4.77	0606	-0.07	1242	4.70	1836	1.71		
17	4.15	0012	4.42	0654	0.54	1330	4.70	1954	1.78
18	3.56	0124	3.70	0736	1.15	1430	4.71	2124	1.67
19	3.41	0254	3.16	0830	1.68	1530	4.77	2254	1.35
20	3.95	0442	2.97	0936	2.07	1618	4.89	2354	0.94
21	2.78	0606	3.08	1042	2.29	1712	5.06		
22	4.71	0048	0.55	0706	3.29	1142	2.35	1754	5.26
23	5.23	0130	0.22	0748	3.48	1230	2.31	1836	5.46
24	5.65	0154	-0.03	0824	3.64	1306	2.22	1912	5.63
25	5.95	0230	-0.20	0848	3.79	1342	2.10	1948	5.74
26	6.10	0254	-0.31	0918	3.93	1418	1.99	2018	5.78
27	6.07	0324	-0.34	0942	4.07	1448	1.90	2048	5.73
28	5.85	0354	-0.29	1012	4.19	1524	1.84	2124	5.56
29	5.43	0418	-0.15	1042	4.30	1606	1.81	2154	5.28
30	4.79	0448	0.09	1106	4.40	1648	1.81	2230	4.88
31	4.09	0518	0.41	1136	4.50	1736	1.83	2312	4.38

TABLE 11. Point Mugu Tides, August 1995

August 1995

Mugu Lagoon (Ocean Piers), CA

34° 06.0' North, 119° 06.0' West

Tidal range, highs, and lows in feet

Pacific Standard Time - Add one hour for Daylight Savings Time

Date	Range	Time	Ht	Time	Ht	Time	Ht	Time	Ht
01	3.80	0548	0.80	1218	4.61	1842	1.82		
02	3.49	0006	3.81	0630	1.24	1306	4.73	1954	1.71
03	3.53	0124	3.27	0712	1.68	1412	4.89	2136	1.37
04	4.36	0324	2.99	0824	2.05	1518	5.15	2254	0.80
05	3.27	0512	3.13	0948	2.25	1630	5.52		
06	5.77	0006	0.17	0624	3.47	1106	2.19	1730	5.94
07	6.71	0054	-0.39	0712	3.86	1212	1.96	1824	6.32
08	7.37	0136	-0.80	0754	4.22	1306	1.65	1912	6.57
09	7.65	0218	-1.02	0830	4.55	1354	1.35	1954	6.63
10	7.51	0254	-1.03	0906	4.80	1442	1.13	2042	6.48
11	6.96	0336	-0.84	0942	4.98	1530	1.01	2124	6.12
12	6.07	0412	-0.48	1018	5.07	1618	1.02	2206	5.58
13	5.06	0448	0.00	1106	5.06	1706	1.14	2254	4.93
14	4.40	0524	0.57	1142	4.98	1754	1.33	2348	4.23
15	3.66	0554	1.17	1230	4.83	1906	1.53		
16	3.07	0054	3.58	0642	1.74	1318	4.67	2036	1.61
17	3.11	0224	3.10	0730	2.24	1424	4.57	2212	1.46
18	3.46	0436	3.01	0848	2.60	1536	4.59	2330	1.13
19	2.04	0606	3.23	1018	2.71	1636	4.75		
20	4.21	0018	0.78	0648	3.49	1130	2.60	1730	4.99
21	4.76	0054	0.48	0718	3.72	1218	2.40	1812	5.24
22	5.22	0130	0.24	0742	3.93	1254	2.15	1848	5.45
23	5.53	0154	0.07	0806	4.14	1330	1.89	1930	5.60
24	5.69	0224	-0.02	0836	4.35	1354	1.64	1954	5.67
25	5.66	0248	-0.03	0854	4.56	1436	1.42	2036	5.62
26	5.41	0318	0.04	0924	4.74	1512	1.24	2112	5.45
27	4.94	0342	0.22	0954	4.90	1548	1.12	2148	5.16
28	4.53	0412	0.50	1024	5.02	1630	.07	2224	4.74
29	4.23	0442	0.86	1048	5.09	1724	1.09	2306	4.23
30	3.95	0512	1.29	1130	5.10	1824	1.15		
31	3.91	0012	3.68	0554	1.75	1218	5.06	1942	1.15

TABLE 13. Point Mugu Tides, October 1995

October 1995

Mugu Lagoon (Ocean Piers), CA

34° 06.0' North, 119° 06.0' West

Tidal range, highs, and lows in feet

Pacific Standard Time - Add one hour for Daylight Savings Time

Date	Range	Time	Ht	Time	Ht	Time	Ht	Time	Ht
01	4.58	0348	3.55	0824	2.76	1430	4.92	2212	0.34
02	4.81	0454	3.92	1006	2.53	1554	4.97	2318	0.16
03	3.10	0548	4.34	1124	2.03	1712	5.13		
04	5.23	0006	0.04	0630	4.76	1218	1.46	1812	5.27
05	5.28	0048	0.04	0706	5.12	1306	0.93	1854	5.32
06	5.26	0124	0.16	0736	5.42	1348	0.50	1948	5.25
07	5.41	0154	0.37	0806	5.62	1430	0.21	2030	5.07
08	5.66	0230	0.66	0830	5.72	1506	0.06	2106	4.80
09	5.66	0254	1.00	0900	5.71	1548	0.05	2142	4.47
10	5.43	0330	1.38	0924	5.59	1624	0.16	2224	4.10
11	5.02	0354	1.76	0954	5.39	1706	0.37	2312	3.74
12	4.49	0424	2.14	1036	5.12	1754	0.63		
13	3.90	0018	3.41	0454	2.51	1112	4.79	1848	0.89
14	3.37	0142	3.22	0536	2.85	1154	4.44	1954	1.07
15	3.01	0342	3.28	0654	3.12	1306	4.13	2118	1.11
16	2.93	0454	3.54	0924	3.09	1442	3.97	2224	1.04
17	3.10	0530	3.83	1048	2.74	1606	4.02	2312	0.92
18	3.36	0554	4.14	1142	2.27	1706	4.19	2354	0.83
19	2.73	0612	4.48	1218	1.75	1754	4.38		
20	4.07	0024	0.77	0636	4.84	1254	1.19	1836	4.54
21	4.57	0054	0.76	0700	5.22	1330	0.65	1918	4.65
22	5.44	0124	0.81	0730	5.58	1406	0.15	2006	4.68
23	6.16	0154	0.93	0806	5.90	1448	-0.26	2054	4.61
24	6.65	0230	1.11	0836	6.13	1530	-0.53	2136	4.44
25	6.85	0306	1.36	0912	6.22	1618	-0.63	2230	4.20
26	6.71	0342	1.67	0954	6.15	1706	-0.57	2330	3.94
27	6.28	0430	2.02	1042	5.90	1806	-0.38		
28	5.65	0042	3.74	0524	2.37	1130	5.51	1912	-0.13
29	4.97	0154	3.72	0642	2.65	1236	5.05	2024	0.08
30	4.44	0318	3.94	0830	2.66	1406	4.67	2136	0.22
31	4.14	0424	4.31	1006	2.28	1536	4.47	2236	0.33

TABLE 12. Point Mugu Tides, September 1995

September 1995

Mugu Lagoon (Ocean Piers), CA

34° 06.0' North, 119° 06.0' West

Tidal range, highs, and lows in feet

Pacific Standard Time - Add one hour for Daylight Savings Time

Date	Range	Time	Ht	Time	Ht	Tme	Ht	Time	Ht
01	4.07	0142	3.24	0642	2.20	1324	5.03	2118	0.95
02	4.53	0342	3.17	0812	2.53	1454	5.10	2242	0.57
03	5.21	0518	3.48	0954	2.55	1612	5.34	2342	0.13
04	3.40	0618	3.88	1112	2.26	1724	5.65		
05	6.17	0036	-0.23	0654	4.30	1218	1.82	1818	5.94
06	6.54	0118	-0.45	0730	4.68	1306	1.35	1906	6.09
07	6.57	0154	-0.49	0806	5.01	1354	0.95	1954	6.07
08	6.25	0230	-0.37	0830	5.26	1436	0.66	2030	5.88
09	5.64	0306	-0.10	0906	5.41	1518	0.52	2112	5.53
10	5.17	0336	-0.28	0936	5.44	1554	0.51	2154	5.07
11	4.73	0406	0.73	1012	5.37	1642	0.64	2236	4.53
12	4.34	0436	1.24	1048	5.20	1730	0.86	2330	3.98
13	3.83	0512	1.74	1124	4.96	1824	1.12		
14	3.34	0030	3.47	0542	2.22	1206	4.68	1936	1.34
15	3.03	0206	3.12	0624	2.65	1306	4.42	2112	1.38
16	3.06	0424	3.15	0754	2.96	1430	4.27	2236	1.21
17	3.38	0542	3.42	0954	2.97	1554	4.34	2330	0.96
18	1.84	0618	3.70	1112	2.70	1654	4.55		
19	4.08	0012	0.72	0642	3.97	1154	2.35		
20	4.49	0048	0.53	0700	4.24	1242	1.95	1742	4.80
21	4.78	0118	0.40	0724	4.52	1312	1.54	1824	5.02
22	4.91	0142	0.35	0748	4.81	1348	1.15	1900	5.18
23	4.87	0206	0.37	0818	5.09	1424	0.79	1942	5.26
24	4.87	0236	0.47	0842	5.34	1454	0.49	2018	5.23
25	5.25	0306	0.67	0912	5.54	1536	0.29	2054	5.09
26	5.45	0336	0.96	0942	5.65	1624	0.21	2142	4.83
27	5.41	0406	1.33	1018	5.66	1712	0.25	2224	4.45
28	5.17	0442	1.75	1054	5.54	1812	0.37	2318	4.02
29	4.83	0024	3.61	0530	2.18	1148	5.32	1930	0.49
30	4.58	0200	3.40	0636	2.58	1300	5.07	2054	0.49

TABLE 14. Point Mugu Tides, November 1995

November 1995

Mugu Lagoon (Ocean Piers), CA

34° 06.0' North, 119° 06.0' West

Tidal range, highs, and lows in feet.

Pacific Standard Time - Add one hour for Daylight Savings Time

Date	Range	Time	Ht	Time	Ht	Time	Ht	Time	Ht
01	4.26	0512	4.71	1124	1.70	1654	4.44	2330	0.45
02	4.01	0554	5.10	1218	1.09	1806	4.46		
03	4.86	0012	0.62	0630	5.42	1306	0.56	1854	4.45
04	5.51	0054	0.83	0706	5.66	1348	0.15	1942	4.39
05	5.93	0124	1.07	0736	5.81	1424	-0.13	2024	4.29
06	6.13	0154	1.32	0806	5.86	1454	-0.27	2106	4.15
07	6.13	0224	1.58	0824	5.84	1536	-0.30	2142	3.98
08	5.95	0254	1.83	0854	5.73	1612	-0.22	2224	3.80
09	5.61	0324	2.08	0924	5.54	1648	-0.07	2306	3.61
10	5.14	0354	2.33	0954	5.29	1730	0.15	2400	3.46
11	4.53	0430	2.59	1036	4.97	1812	0.39		
12	3.96	0106	3.37	0512	2.84	1112	4.60	1906	0.64
13	3.35	0224	3.42	0618	3.04	1206	4.20	1954	0.84
14	2.83	0336	3.60	0812	3.05	1318	3.82	2054	0.99
15	2.82	0424	3.89	0954	2.74	1454	3.59	2154	1.07
16	3.11	0454	4.23	1106	2.21	1618	3.57	2242	1.12
17	3.46	0524	4.62	1154	1.58	1724	3.68	2324	1.16
18	4.15	0548	5.05	1236	0.90	1818	3.85		
19	5.27	0006	1.20	0618	5.51	1318	0.23	1906	4.01
20	6.32	0042	1.25	0654	5.95	1354	-0.37	1954	4.13
21	7.18	0124	1.32	0730	6.32	1436	-0.86	2048	4.19
22	7.74	0154	1.43	0812	6.57	1524	-1.17	2136	4.19
23	7.92	0242	1.57	0854	6.64	1606	-1.28	2230	4.13
24	7.70	0330	1.75	0936	6.50	1654	-1.19	2324	4.06
25	7.09	0424	1.98	1030	6.16	1748	-0.93		
26	6.18	0024	4.03	0524	2.21	1124	5.63	1848	-0.56
27	5.12	0130	4.09	0642	2.38	1218	4.99	1948	-0.13
28	4.09	0236	4.27	0812	2.34	1336	4.37	2048	0.29
29	3.91	0336	4.56	0954	1.99	1512	3.93	2148	0.65
30	3.93	0430	4.89	1112	1.43	1636	3.72	2248	0.96

TABLE 15. Point Mugu Tides, December 1995

December 1995

Mugu Lagoon (Ocean Piers), CA

34° 06.0' North, 119° 06.0' West

Tidal range, highs, and lows in feet

Pacific Standard Time - Add one hour for Daylight Savings Time

Date	Range	Time	Ht	Time	Ht	Time	Ht	Time	Ht
01	4.36	0518	5.21	1212	0.84	1754	3.69	2336	1.23
02	5.13	0606	5.47	1254	0.34	1854	3.72		
03	5.70	0018	1.45	0636	5.66	1342	-0.04	1948	3.75
04	6.08	0054	1.64	0712	5.78	1418	-0.30	2030	3.77
05	6.29	0130	1.80	0742	5.83	1454	-0.45	2106	3.76
06	6.34	0154	1.92	0812	5.83	1524	-0.51	2142	3.74
07	6.26	0236	2.03	0836	5.77	1554	-0.49	2212	3.70
08	6.03	0306	2.15	0906	5.64	1630	-0.39	2254	3.65
09	5.66	0336	2.27	0936	5.43	1706	-0.23	2330	3.61
10	5.14	0412	2.42	1006	5.14	1736	-0.01		
11	4.50	0018	3.59	0454	2.58	1048	4.76	1818	0.26
12	3.76	0112	3.63	0554	2.72	1124	4.32	1854	0.56
13	2.97	0154	3.74	0712	2.77	1218	3.83	1942	0.86
14	2.81	0254	3.95	0854	2.58	1336	3.37	2030	1.14
15	2.89	0342	4.26	1024	2.10	1524	3.09	2130	1.37
16	3.23	0424	4.66	1130	1.42	1654	3.09	2224	1.53
17	4.45	0506	5.12	1218	0.68	1806	3.28	2318	1.61
18	5.69	0542	5.62	1306	-0.06	1900	3.53		
19	6.83	0006	1.62	0624	6.11	1348	-0.72	1954	3.78
20	7.75	0054	1.59	0706	6.52	1430	-1.24	2042	4.00
21	8.33	0148	1.54	0754	6.78	1512	-1.55	2130	4.16
22	8.48	0236	1.51	0842	6.84	1554	-1.64	2218	4.26
23	8.16	0324	1.53	0930	6.66	1642	-1.50	2306	4.33
24	7.39	0418	1.61	1018	6.24	1730	-1.15	2354	4.38
25	6.26	0512	1.74	1112	5.61	1812	-0.66		
26	4.91	0048	4.44	0624	1.86	1206	4.84	1906	-0.07
27	3.99	0148	4.52	0748	1.90	1312	4.06	1954	0.53
28	3.58	0242	4.65	0924	1.71	1442	3.43	2054	1.07
29	3.55	0342	4.83	1054	1.28	1624	3.14	2154	1.49
30	4.28	0442	5.04	1154	0.76	1754	3.15	2254	1.78
31	4.95	0530	5.24	1254	0.29	1906	3.29	2354	1.93

TABLE 16. San Nicolas Island Tides, January 1995

January 1995

San Nicolas Island, CA

33° 16.0' North, 119° 30.0' West

Tidal range, highs, and lows in feet

Pacific Standard Time - Add one hour for Daylight Savings Time

Date	Range	Time	Ht	Time	Ht	Time	Ht	Time	Ht
01	7.77	0236	1.38	0836	6.24	1548	-1.53	2212	3.94
02	7.39	0318	1.34	0924	6.04	1630	-1.35	2254	4.01
03	6.64	0406	1.37	1006	5.64	1712	-1.00	2336	4.04
04	5.58	0500	1.47	1054	5.07	1754	-0.52		
05	4.35	0024	4.04	0554	1.62	1136	4.38	1836	0.03
06	3.42	0154	4.02	0836	1.77	1342	3.00	2006	1.14
07	2.50	0254	4.06	1018	1.56	1530	2.56	2054	1.59
08	3.01	0354	4.16	1142	1.15	1730	2.50	2206	1.91
09	3.63	0454	4.32	1242	0.69	1854	2.67	2318	2.06
10	4.19	0548	4.53	1312	0.35	1936	2.89		
11	4.74	0006	1.99	0624	4.75	1348	0.01	2012	3.07
12	5.22	0048	1.94	0654	4.96	1418	-0.26	2042	3.22
13	5.59	0124	1.85	0730	5.13	1448	-0.46	2106	3.35
14	5.84	0200	1.75	0806	5.25	1524	-0.59	2136	3.47
15	5.93	0236	1.66	0836	5.29	1548	-0.64	2154	3.58
16	5.84	0312	1.59	0906	5.24	1618	-0.60	2230	3.68
17	5.53	0348	1.54	0942	5.07	1648	-0.47	2254	3.77
18	5.00	0430	1.53	1018	4.77	1718	0.23	2336	3.86
19	4.25	0518	1.55	1054	4.35	1748	0.09		
20	3.46	0012	3.95	0612	1.57	1142	3.81	1818	0.49
21	3.12	0054	4.05	0718	1.55	1242	3.22	1900	0.93
22	2.83	0154	4.19	0854	1.36	1418	2.71	2000	1.36
23	3.48	0254	4.39	1030	0.91	1624	2.55	2112	1.69
24	4.39	0406	4.68	1154	0.29	1754	2.77	2242	1.81
25	5.37	0512	5.05	1248	-0.31	1906	3.11	2354	1.72
26	6.24	0606	5.43	1336	-0.81	1948	3.44		
27	6.87	0054	1.51	0654	5.73	1418	-1.14	2030	3.74
28	7.17	0148	1.27	0748	5.89	1454	-1.28	2106	3.97
29	7.11	0230	1.06	0830	5.87	1536	-1.24	2142	4.14
30	6.68	0318	0.93	0912	5.66	1606	-1.02	2218	4.24

TABLE 17. San Nicolas Island Tides, February 1995

February 1995

San Nicolas Island, CA

33° 16.0' North, 119° 30.0' West

Tidal range, highs, and lows in feet

Pacific Standard Time - Add one hour for Daylight Savings Time

Date	Range	Time	Ht	Time	Ht	Time	Ht	Time	Ht
01	5.94	0354	0.89	0954	5.27	1642	-0.66	2254	4.26
02	4.95	0442	0.96	1036	4.75	1712	-0.20	2330	4.21
03	3.82	0530	1.10	1118	4.14	1748	0.31		
04	3.27	0012	4.12	0624	1.28	1154	3.49	1824	0.84
05	2.65	0054	3.99	0736	1.44	1254	2.88	1854	1.35
06	2.42	0148	3.88	0912	1.45	1436	2.42	1948	1.79
07	2.62	0254	3.83	1054	1.22	1712	2.36	2106	2.12
08	3.09	0406	3.91	1206	0.83	1842	2.60	2242	2.22
09	3.68	0506	4.11	1254	0.44	1924	2.85	2354	2.13
10	4.28	0554	4.37	1324	0.10	1948	3.07		
11	4.82	0036	1.94	0636	4.64	1354	-0.18	2012	3.29
12	5.26	0112	1.71	0712	4.87	1418	-0.39	2036	3.49
13	5.56	0148	1.46	0748	5.04	1448	-0.52	2054	3.70
14	5.68	0224	1.23	0824	5.12	1518	-0.56	2124	3.90
15	5.59	0254	1.02	0854	5.08	1548	-0.51	2154	4.08
16	5.24	0342	0.85	0930	4.91	1618	-0.34	2218	4.23
17	4.64	0418	0.74	1012	4.59	1648	-0.05	2254	4.34
18	4.08	0506	0.71	1054	4.13	1718	0.32	2330	4.40
19	2.83	0554	0.75	1142	3.58	1754	0.77		
20	3.60	0012	4.40	0706	0.80	1248	3.00	1830	1.24
21	3.60	0112	4.37	0830	0.77	1430	2.59	1930	1.69
22	3.86	0224	4.36	1012	0.50	1642	2.59	2100	1.98
23	4.41	0342	4.48	1130	0.07	1806	2.92	2242	1.95
24	5.09	0454	4.73	1230	-0.36	1854	3.29	2354	1.68
25	5.69	0554	5.01	1318	-0.68	1936	3.64		
26	6.08	0054	1.31	0654	5.23	1354	-0.85	2006	3.95
27	6.18	0148	0.94	0742	5.32	1436	-0.86	2042	4.19
28	5.98	0230	0.65	0824	5.26	1512	-0.72	2112	4.37

TABLE 19. San Nicolas Island Tides, April 1995

April 1995

San Nicolas Island, CA

33° 16.0' North, 119° 30.0' West

Tidal range, highs, and lows in feet

Pacific Standard Time - Add one hour for Daylight Savings Time

Date	Range	Time	Ht	Time	Ht	Time	Ht	Time	Ht
01	4.65	0412	-0.07	1006	3.74	1554	0.85	2154	4.58
02	4.40	0442	0.02	1048	3.41	1618	1.19	2224	4.43
03	4.03	0524	0.19	1130	3.06	1648	1.52	2254	4.22
04	3.56	0612	0.41	1230	2.73	1712	1.85	2330	3.97
05	1.88	0706	0.62	1348	2.51	1754	2.16		
06	2.94	0018	3.70	0830	0.76	1554	2.53	1906	2.42
07	2.73	0130	3.46	0954	0.74	1718	2.76	2130	2.46
08	2.77	0306	3.38	1054	0.61	1754	3.04	2254	2.18
09	3.04	0430	3.48	1142	0.44	1818	3.34	2354	1.75
10	3.38	0530	3.68	1224	0.30	1842	3.68		
11	3.84	0036	1.25	0618	3.90	1248	0.20	1906	4.04
12	4.26	0112	0.72	0706	4.08	1324	0.17	1930	4.43
13	4.60	0148	0.19	0748	4.19	1354	0.20	1954	4.79
14	5.37	0230	-0.28	0830	4.19	1430	0.32	2030	5.09
15	5.93	0312	-0.64	0918	4.09	1506	0.53	2106	5.29
16	6.20	0406	-0.86	1006	3.88	1548	0.80	2148	5.35
17	6.14	0454	-0.90	1054	3.60	1624	1.14	2230	5.24
18	5.77	0548	-0.79	1206	3.31	1712	1.50	2318	4.98
19	3.69	0648	-0.58	1318	3.11	1818	1.84		
20	4.95	0018	4.61	0754	-0.35	1448	3.11	1942	2.07
21	4.39	0136	4.22	0912	-0.17	1606	3.32	2118	2.02
22	4.02	0254	3.94	1018	-0.08	1706	3.64	2248	1.66
23	3.97	0430	3.84	1118	0.00	1754	3.98	2354	1.17
24	4.16	0536	3.84	1206	0.12	1830	4.28		
25	4.25	0048	0.69	0636	3.85	1254	0.27	1906	4.52
26	4.41	0136	0.29	0724	3.82	1330	0.47	1936	4.70
27	4.83	0218	-0.02	0806	3.75	1354	0.69	1954	4.81
28	5.09	0254	-0.23	0848	3.64	1430	0.92	2030	4.86
29	5.19	0324	-0.34	0924	3.50	1454	1.14	2054	4.85
30	5.14	0354	-0.37	1006	3.34	1524	1.37	2124	4.77

TABLE 18. San Nicolas Island Tides, March 1995

March 1995

San Nicolas Island, CA

33° 16.0' North, 119° 30.0' West

Tidal range, highs, and lows in feet

Pacific Standard Time - Add one hour for Daylight Savings Time

Date	Range	Time	Ht	Time	Ht	Time	Ht	Time	Ht
01	5.52	0312	0.45	0854	5.05	1542	-0.47	2142	4.46
02	4.83	0348	0.37	0942	4.71	1606	-0.12	2212	4.47
03	4.11	0424	0.40	1018	4.27	1636	0.29	2242	4.40
04	3.74	0506	0.52	1054	3.78	1700	0.73	2312	4.26
05	3.36	0548	0.71	1142	3.26	1730	1.17	2348	4.07
06	1.84	0642	0.93	1236	2.77	1754	1.60		
07	2.75	0030	3.85	0754	1.10	1406	2.39	1830	1.98
08	2.57	0124	3.66	0942	1.09	1654	2.37	1942	2.30
09	2.72	0248	3.57	1112	0.85	1818	2.64	2212	2.38
10	3.13	0418	3.68	1206	0.55	1848	2.91	2330	2.17
11	3.66	0518	3.92	1248	0.26	1912	3.17		
12	4.17	0024	1.85	0606	4.19	1312	0.02	1930	3.44
13	4.60	0054	1.48	0648	4.44	1342	-0.15	1954	3.72
14	4.88	0130	1.08	0724	4.63	1406	-0.25	2018	4.02
15	4.99	0206	0.70	0806	4.72	1436	-0.26	2042	4.31
16	4.87	0242	0.34	0842	4.70	1512	-0.17	2112	4.56
17	4.72	0330	0.06	0924	4.54	1542	0.03	2142	4.76
18	4.97	0412	-0.11	1006	4.24	1612	0.33	2218	4.85
19	5.00	0454	-0.16	1054	3.83	1648	0.72	2254	4.84
20	4.80	0554	-0.09	1154	3.35	1730	1.15	2342	4.71
21	2.88	0654	0.05	1306	2.93	1818	1.60		
22	4.34	0036	4.49	0818	0.15	1454	2.74	1924	1.97
23	4.18	0154	4.28	0942	0.10	1636	2.90	2112	2.10
24	4.29	0324	4.21	1100	-0.08	1742	3.25	2248	1.86
25	4.57	0448	4.30	1200	-0.26	1830	3.61	2400	1.43
26	4.82	0554	4.46	1254	-0.36	1906	3.95		
27	4.92	0054	0.97	0648	4.57	1330	-0.35	1936	4.24
28	4.82	0142	0.56	0730	4.58	1406	-0.24	2006	4.46
29	4.64	0224	0.24	0812	4.49	1436	-0.04	2036	4.60
30	4.64	0254	0.03	0854	4.30	1506	0.22	2106	4.67
31	4.73	0336	-0.07	0930	4.05	1530	0.52	2130	4.66

TABLE 20. San Nicolas Island Tides, May 1995

May 1995

San Nicolas Island, CA

33° 16.0' North, 119° 30.0' West

Tidal range, highs, and lows in feet

Pacific Standard Time - Add one hour for Daylight Savings Time

Date	Range	Time	Ht	Time	Ht	Time	Ht	Time	Ht
01	4.95	0436	-0.31	1048	3.17	1548	1.60	2148	4.63
02	4.62	0506	-0.19	1130	2.99	1612	1.84	2224	4.44
03	4.20	0548	-0.01	1224	2.84	1648	2.07	2254	4.19
04	3.71	0636	0.19	1330	2.76	1730	2.30	2336	3.89
05	2.43	0730	0.37	1448	2.81	1848	2.48		
06	3.08	0030	3.58	0836	0.51	1554	2.99	2042	2.48
07	2.74	0148	3.32	0936	0.58	1642	3.27	2218	2.18
08	3.00	0324	3.20	1030	0.61	1718	3.60	2324	1.68
09	3.38	0442	3.24	1118	0.62	1748	4.00		
10	3.79	0012	1.09	0548	3.37	1154	0.63	1818	4.43
11	4.42	0054	0.45	0642	3.53	1230	0.68	1848	4.87
12	5.45	0136	-0.18	0736	3.66	1312	0.75	1924	5.28
13	6.31	0218	-0.72	0824	3.74	1354	0.86	1954	5.59
14	6.90	0306	-1.12	0918	3.75	1436	1.01	2042	5.77
15	7.12	0348	-1.35	1006	3.69	1524	1.20	2124	5.77
16	6.96	0448	-1.38	1106	3.59	1612	1.42	2212	5.59
17	6.45	0536	-1.23	1206	3.51	1706	1.67	2306	5.22
18	4.42	0636	-0.94	1312	3.48	1812	1.89		
19	5.31	0006	4.72	0736	-0.58	1418	3.56	1936	2.00
20	4.40	0112	4.18	0836	-0.21	1524	3.75	2112	1.88
21	3.88	0236	3.71	0930	0.13	1624	4.01	2236	1.52
22	3.85	0354	3.41	1030	0.43	1712	4.28	2342	1.05
23	3.83	0518	3.28	1124	0.70	1754	4.53		
24	4.13	0036	0.59	0624	3.24	1206	0.94	1830	4.72
25	4.66	0124	0.20	0718	3.24	1248	1.16	1854	4.87
26	5.05	0206	-0.09	0806	3.25	1324	1.34	1930	4.96
27	5.32	0242	-0.30	0848	3.24	1354	1.50	1954	5.02
28	5.45	0318	-0.43	0924	3.22	1424	1.63	2030	5.03
29	5.47	0348	-0.48	1006	3.20	1454	1.76	2054	4.99
30	5.35	0424	-0.47	1042	3.16	1530	1.88	2130	4.88
31	5.10	0454	-0.40	1124	3.12	1554	2.02	2154	4.71

TABLE 21. San Nicolas Island Tides, June 1995

June 1995

San Nicolas Island, CA

33° 16.0' North, 119° 30.0' West

Tidal range, highs, and lows in feet

Pacific Standard Time - Add one hour for Daylight Savings Time

Date	Range	Time	Ht	Time	Ht	Time	Ht	Time	Ht
01	4.73	0524	-0.26	1206	3.10	1636	2.17	2236	4.47
02	4.25	0606	-0.09	1254	3.11	1724	2.31	2312	4.16
03	3.68	0648	0.13	1348	3.18	1824	2.41	2354	3.81
04	2.99	0730	0.35	1436	3.34	1954	2.39		
05	3.01	0054	3.42	0824	0.58	1524	3.59	2130	2.12
06	3.14	0224	3.09	0918	0.79	1612	3.93	2248	1.62
07	3.37	0354	2.94	1012	0.97	1654	4.34	2348	0.98
08	3.69	0524	2.98	1054	1.10	1730	4.79		
09	4.96	0042	0.29	0630	3.13	1154	1.20	1812	5.25
10	6.03	0130	-0.37	0730	3.33	1236	1.26	1854	5.66
11	6.90	0212	-0.92	0824	3.51	1324	1.30	1942	5.97
12	7.44	0254	-1.32	0912	3.65	1412	1.34	2024	6.12
13	7.60	0342	-1.52	1006	3.75	1506	1.39	2112	6.08
14	7.34	0430	-1.51	1054	3.81	1554	1.48	2154	5.83
15	6.69	0524	-1.30	1148	3.85	1654	1.61	2254	5.39
16	5.74	0612	-0.95	1242	3.90	1754	1.74	2348	4.80
17	4.46	0654	-0.48	1336	3.97	1918	1.82		
18	4.11	0048	4.14	0754	0.03	1436	4.09	2042	1.76
19	3.72	0154	3.53	0848	0.52	1536	4.25	2212	1.50
20	3.46	0330	3.08	0936	0.96	1630	4.43	2324	1.10
21	3.29	0454	2.89	1030	1.31	1712	4.61		
22	4.09	0024	0.68	0618	2.89	1124	1.57	1754	4.77
23	4.61	0112	0.30	0718	2.98	1212	1.74	1830	4.91
24	5.03	0154	0.01	0806	3.08	1254	1.84	1906	5.04
25	5.34	0230	-0.21	0848	3.17	1330	1.89	1936	5.13
26	5.55	0306	-0.36	0918	3.25	1406	1.91	2012	5.19
27	5.64	0336	-0.45	0954	3.32	1442	1.92	2042	5.19
28	5.59	0406	-0.47	1024	3.37	1512	1.94	2112	5.12
29	5.39	0436	-0.42	1054	3.42	1548	1.99	2142	4.97
30	5.03	0506	-0.31	1130	3.47	1624	2.05	2218	4.73

TABLE 22. San Nicolas Island Tides, July 1995

July 1995

San Nicolas Island, CA

33° 16.0' North, 119° 30.0' West

Tidal range, highs, and lows in feet

Pacific Standard Time - Add one hour for Daylight Savings Time

Date	Range	Time	Ht	Time	Ht	Time	Ht	Time	Ht
01	4.52	0530	-0.12	1206	3.53	1706	2.12	2254	4.40
02	3.86	0606	0.12	1248	3.62	1800	2.16	2336	3.99
03	3.34	0642	0.42	1330	3.76	1912	2.13		
04	3.21	0030	3.52	0718	0.76	1418	3.97	2048	1.93
05	3.15	0148	3.06	0812	1.10	1512	4.25	2218	1.49
06	3.73	0330	2.78	0912	1.39	1606	4.61	2330	0.88
07	3.43	0512	2.79	1018	1.60	1654	5.03		
08	5.25	0030	0.21	0630	3.01	1124	1.68	1748	5.46
09	6.27	0118	-0.41	0730	3.29	1224	1.64	1842	5.85
10	7.05	0206	-0.91	0818	3.57	1312	1.54	1930	6.14
11	7.50	0242	-1.24	0854	3.82	1406	1.42	2018	6.25
12	7.54	0324	-1.37	0948	4.01	1454	1.33	2054	6.17
13	7.15	0412	-1.29	1030	4.16	1548	1.30	2148	5.87
14	6.39	0454	-1.01	1112	4.25	1648	1.34	2236	5.38
15	5.34	0536	-0.59	1154	4.30	1742	1.45	2324	4.74
16	4.38	0618	-0.07	1248	4.31	1848	1.57		
17	3.81	0018	4.05	0706	0.50	1336	4.30	2006	1.63
18	3.26	0130	3.39	0748	1.05	1436	4.31	2136	1.53
19	3.13	0254	2.90	0842	1.54	1536	4.37	2306	1.24
20	2.59	0448	2.73	0942	1.90	1630	4.48		
21	3.78	0006	0.86	0618	2.83	1048	2.10	1724	4.64
22	4.32	0054	0.50	0718	3.01	1148	2.16	1806	4.82
23	4.80	0136	0.21	0754	3.19	1236	2.12	1848	5.00
24	5.18	0206	-0.02	0830	3.34	1318	2.03	1918	5.16
25	5.45	0242	-0.19	0854	3.48	1354	1.93	1954	5.26
26	5.59	0312	-0.29	0924	3.61	1430	1.82	2024	5.30
27	5.56	0336	-0.31	0948	3.73	1454	1.74	2054	5.25
28	5.37	0406	-0.27	1018	3.84	1536	1.68	2130	5.10
29	4.98	0430	-0.13	1048	3.94	1618	1.66	2154	4.84
30	4.40	0454	0.08	1118	4.04	1654	1.66	2242	4.48
31	3.75	0524	0.38	1148	4.13	1742	1.68	2324	4.02

TABLE 23. San Nicolas Island Tides, August 1995

August 1995

San Nicolas Island, CA

33° 16.0' North, 119° 30.0' West

Tidal range, highs, and lows in feet

Pacific Standard Time - Add one hour for Daylight Savings Time

Date	Range	Time	Ht	Time	Ht	Time	Ht	Time	Ht
01	3.49	0554	0.73	1230	4.22	1848	1.67		
02	3.20	0018	3.49	0636	1.13	1318	4.33	2006	1.57
03	3.23	0136	3.00	0718	1.54	1418	4.49	2148	1.25
04	3.99	0330	2.74	0836	1.88	1524	4.72	2312	0.73
05	3.00	0518	2.87	0954	2.06	1636	5.06		
06	5.29	0018	0.16	0630	3.18	1118	2.01	1736	5.44
07	6.15	0106	-0.36	0718	3.54	1224	1.80	1830	5.79
08	6.75	0148	-0.73	0754	3.87	1318	1.52	1918	6.02
09	7.01	0230	-0.93	0842	4.17	1400	1.24	2006	6.08
10	6.89	0306	-0.95	0918	4.40	1448	1.03	2054	5.94
11	6.38	0342	-0.77	0954	4.57	1536	0.93	2136	5.61
12	5.56	0418	-0.44	1030	4.65	1624	0.94	2218	5.12
13	4.64	0454	0.00	1112	4.64	1718	1.05	2306	4.52
14	4.03	0536	0.53	1148	4.56	1812	1.22	2354	3.88
15	3.35	0612	1.07	1236	4.43	1918	1.40		
16	2.81	0054	3.28	0654	1.60	1324	4.28	2048	1.47
17	2.85	0230	2.84	0742	2.05	1430	4.19	2224	1.34
18	3.17	0442	2.75	0854	2.38	1542	4.21	2342	1.04
19	1.87	0612	2.96	1024	2.48	1648	4.35		
20	3.86	0024	0.72	0654	3.20	1136	2.39	1742	4.57
21	4.36	0106	0.44	0730	3.41	1224	2.20	1824	4.80
22	4.78	0136	0.22	0754	3.61	1300	1.97	1854	5.00
23	5.07	0206	0.06	0818	3.80	1342	1.73	1936	5.14
24	5.22	0236	-0.02	0842	3.99	1412	1.50	2006	5.19
25	5.18	0254	-0.03	0906	4.18	1448	1.30	2042	5.15
26	4.96	0330	0.04	0930	4.35	1524	1.14	2118	5.00
27	4.53	0354	0.20	0954	4.49	1554	1.03	2154	4.73
28	4.15	0424	0.45	1030	4.60	1642	0.98	2230	4.35
29	3.88	0454	0.79	1054	4.66	1730	1.00	2318	3.88
30	3.62	0518	1.18	1142	4.67	1830	1.05		
31	3.59	0024	3.37	0600	1.60	1230	4.64	1948	1.05

TABLE 24. San Nicolas Island Tides, September 1995

September 1995

San Nicolas Island, CA

33° 16.0' North, 119° 30.0' West

Tidal range, highs, and lows in feet

Pacific Standard Time - Add one hour for Daylight Savings Time

Date	Range	Time	Ht	Time	Ht	Time	Ht	Time	Ht
01	3.73	0154	2.97	0648	2.02	1336	4.61	2124	0.88
02	4.15	0354	2.91	0818	2.32	1454	4.68	2254	0.52
03	4.77	0524	3.19	1006	2.34	1618	4.89	2354	0.12
04	3.11	0624	3.56	1124	2.07	1730	5.18		
05	5.65	0048	-0.21	0654	3.94	1230	1.61	1824	5.44
06	5.99	0130	-0.41	0736	4.29	1318	1.21	1912	5.58
07	6.02	0206	-0.45	0812	4.59	1406	0.81	1954	5.57
08	5.73	0242	-0.34	0842	4.82	1442	0.61	2042	5.39
09	5.17	0312	-0.10	0918	4.96	1524	0.47	2124	5.07
10	4.74	0342	0.25	0948	4.99	1606	0.47	2206	4.65
11	4.33	0412	0.67	1024	4.92	1648	0.59	2248	4.16
12	3.98	0442	1.13	1054	4.77	1742	0.79	2336	3.65
13	3.51	0524	1.60	1130	4.54	1836	1.03		
14	3.06	0036	3.18	0554	2.04	1212	4.29	1948	1.23
15	2.78	0212	2.86	0636	2.43	1312	4.05	2124	1.27
16	2.80	0430	2.88	0806	2.71	1436	3.91	2248	1.11
17	3.10	0548	3.13	1012	2.72	1554	3.97	2342	0.88
18	1.69	0624	3.39	1118	2.48	1706	4.17		
19	3.74	0018	0.66	0654	3.64	1206	2.15	1754	4.40
20	4.12	0054	0.48	0712	3.88	1248	1.79	1836	4.60
21	4.38	0124	0.37	0736	4.14	1318	1.42	1912	4.75
22	4.50	0148	0.32	0754	4.41	1354	1.05	1948	4.82
23	4.46	0218	0.34	0824	4.67	1436	0.72	2024	4.80
24	4.47	0248	0.43	0848	4.90	1512	0.45	2106	4.67
25	4.82	0318	0.62	0918	5.08	1548	0.26	2148	4.42
26	4.99	0348	0.88	0948	5.18	1636	0.19	2230	4.08
27	4.96	0418	1.22	1024	5.19	1724	0.23	2324	3.68
28	4.74	0454	1.60	1106	5.08	1818	0.34		
29	4.43	0036	3.31	0536	2.00	1154	4.88	1936	0.45
30	4.20	0212	3.12	0642	2.36	1312	4.65	2100	0.45

TABLE 25. San Nicolas Island Tides, October 1995

October 1995

San Nicolas Island, CA

33° 16.0' North, 119° 30.0' West

Tidal range, highs, and lows in feet

Pacific Standard Time - Add one hour for Daylight Savings Time

Date	Range	Time	Ht	Time	Ht	Time	Ht	Time	Ht
01	4.20	0354	3.25	0830	2.53	1442	4.51	2218	0.31
02	4.41	0506	3.59	1018	2.32	1606	4.56	2330	0.15
03	2.84	0554	3.98	1136	1.86	1718	4.70		
04	4.79	0018	0.04	0636	4.36	1230	1.34	1818	4.84
05	4.84	0054	0.04	0712	4.70	1318	0.85	1906	4.88
06	4.83	0136	0.14	0742	4.97	1354	0.46	1954	4.81
07	4.96	0212	0.34	0812	5.15	1442	0.19	2036	4.65
08	5.19	0242	0.60	0842	5.24	1512	0.06	2118	4.40
09	5.18	0306	0.92	0912	5.23	1554	0.05	2154	4.10
10	4.98	0336	1.26	0936	5.13	1630	0.15	2236	3.76
11	4.60	0400	1.62	1006	4.94	1712	0.34	2324	3.43
12	4.11	0430	1.97	1042	4.69	1806	0.58		
13	3.58	0024	3.13	0506	2.30	1118	4.39	1854	0.82
14	3.09	0148	2.95	0548	2.61	1154	4.07	2012	0.99
15	2.76	0348	3.01	0712	2.86	1312	3.78	2130	1.02
16	2.69	0454	3.25	0936	2.83	1448	3.64	2236	0.95
17	2.84	0536	3.51	1054	2.51	1612	3.69	2324	0.85
18	3.08	0554	3.80	1148	2.08	1718	3.84	2400	0.76
19	2.51	0624	4.11	1224	1.60	1806	4.01		
20	3.73	0030	0.71	0648	4.44	1300	1.09	1848	4.16
21	4.19	0100	0.70	0712	4.78	1336	0.59	1930	4.26
22	4.98	0130	0.74	0742	5.12	1418	0.14	2012	4.29
23	5.65	0206	0.85	0812	5.41	1454	-0.24	2054	4.22
24	6.10	0242	1.01	0842	5.62	1542	-0.48	2142	4.07
25	6.28	0318	1.24	0918	5.70	1630	-0.57	2236	3.85
26	6.15	0354	1.53	0954	5.63	1718	-0.52	2336	3.61
27	5.75	0442	1.85	1048	5.41	1818	-0.34		
28	5.17	0048	3.43	0536	2.18	1142	5.05	1918	-0.12
29	4.56	0206	3.41	0648	2.43	1248	4.63	2030	0.07
30	4.07	0330	3.61	0836	2.44	1418	4.28	2142	0.21
31	3.80	0436	3.95	1012	2.09	1548	4.10	2242	0.30

TABLE 27. San Nicolas Island Tides, December 1995

December 1995

San Nicolas Island, CA

33° 16.0' North, 119° 30.0' West

Tidal range, highs, and lows in feet

Pacific Standard Time - Add one hour for Daylight Savings Time

Date	Range	Time	Ht	Time	Ht	Time	Ht	Time	Ht
01	4.00	0530	4.77	1224	0.77	1806	3.38	2348	1.13
02	4.70	0612	5.01	1312	0.31	1906	3.41		
03	5.23	0030	1.33	0642	5.19	1354	-0.04	1954	3.44
04	5.57	0112	1.50	0718	5.30	1430	-0.28	2036	3.45
05	5.76	0142	1.65	0748	5.35	1506	-0.41	2112	3.45
06	5.81	0212	1.76	0818	5.35	1536	-0.47	2148	3.42
07	5.74	0248	1.86	0848	5.29	1600	-0.45	2224	3.39
08	5.53	0312	1.97	0918	5.17	1636	-0.36	2306	3.35
09	5.18	0342	2.09	0948	4.98	1712	-0.21	2342	3.31
10	4.71	0418	2.22	1018	4.71	1742	-0.01		
11	4.13	0030	3.29	0500	2.37	1054	4.37	1830	0.24
12	3.45	0118	3.32	0606	2.49	1130	3.96	1906	0.51
13	2.73	0206	3.43	0724	2.53	1224	3.52	1954	0.79
14	2.57	0254	3.62	0906	2.37	1342	3.09	2042	1.05
15	2.65	0348	3.90	1036	1.92	1530	2.83	2142	1.26
16	2.96	0430	4.27	1142	1.30	1706	2.83	2236	1.40
17	4.08	0512	4.70	1224	0.62	1818	3.00	2324	1.48
18	5.21	0554	5.16	1312	-0.06	1912	3.24		
19	6.26	0012	1.49	0636	5.60	1354	-0.66	2006	3.47
20	7.11	0106	1.46	0718	5.97	1436	-1.13	2054	3.66
21	7.64	0154	1.42	0806	6.21	1524	-1.42	2136	3.81
22	7.77	0248	1.39	0848	6.27	1606	-1.51	2224	3.91
23	7.48	0336	1.40	0936	6.10	1654	-1.38	2312	3.97
24	6.78	0430	1.47	1024	5.72	1742	-1.06	2354	4.02
25	5.74	0524	1.59	1118	5.14	1824	-0.60		
26	4.50	0054	4.07	0636	1.71	1212	4.44	1918	-0.06
27	3.66	0154	4.14	0754	1.74	1324	3.72	2006	0.49
28	3.28	0254	4.26	0930	1.56	1454	3.15	2106	0.98
29	3.26	0354	4.43	1100	1.17	1636	2.88	2206	1.37
30	3.92	0454	4.62	1206	0.69	1806	2.89	2306	1.63
31	4.54	0542	4.80	1306	0.26	1912	3.02		

TABLE 26. San Nicolas Island Tides, November 1995

November 1995

San Nicolas Island, CA

33° 16.0' North, 119° 30.0' West

Tidal range, highs, and lows in feet

Pacific Standard Time - Add one hour for Daylight Savings Time

Date	Range	Time	Ht	Time	Ht	Time	Ht	Time	Ht
01	3.90	0524	4.32	1136	1.56	1706	4.07	2342	0.42
02	3.67	0606	4.67	1230	1.00	1812	4.09		
03	4.46	0024	0.57	0636	4.97	1318	0.51	1906	4.08
04	5.05	0106	0.76	0712	5.19	1354	0.14	1948	4.03
05	5.44	0136	0.98	0742	5.33	1436	-0.11	2030	3.93
06	5.62	0206	1.21	0812	5.38	1512	-0.25	2112	3.80
07	5.62	0236	1.44	0836	5.35	1542	-0.27	2154	3.65
08	5.45	0300	1.68	0906	5.25	1618	-0.20	2236	3.48
09	5.14	0330	1.91	0936	5.08	1654	-0.06	2318	3.31
10	4.71	0400	2.14	1006	4.85	1736	0.13		
11	4.19	0012	3.17	0436	2.37	1042	4.56	1824	0.36
12	3.63	0112	3.09	0524	2.60	1118	4.21	1918	0.59
13	3.07	0230	3.13	0630	2.79	1212	3.85	2012	0.77
14	2.60	0342	3.30	0824	2.80	1324	3.50	2112	0.90
15	2.58	0430	3.56	1012	2.51	1454	3.29	2206	0.98
16	2.85	0454	3.87	1118	2.03	1624	3.27	2254	1.03
17	3.17	0530	4.23	1200	1.45	1736	3.37	2330	1.06
18	3.80	0554	4.63	1242	0.83	1830	3.53		
19	4.84	0012	1.10	0630	5.05	1324	0.22	1918	3.67
20	5.79	0048	1.15	0706	5.45	1400	-0.34	2006	3.79
21	6.58	0130	1.21	0742	5.79	1448	-0.79	2054	3.84
22	7.09	0212	1.31	0818	6.02	1536	-1.07	2142	3.84
23	7.26	0254	1.44	0854	6.08	1618	-1.18	2236	3.79
24	7.06	0342	1.61	0942	5.96	1712	-1.09	2330	3.72
25	6.50	0436	1.81	1036	5.64	1754	-0.86		
26	5.67	0030	3.69	0536	2.03	1130	5.16	1854	-0.51
27	4.70	0136	3.75	0654	2.18	1230	4.58	1954	-0.12
28	3.75	0248	3.92	0818	2.14	1348	4.01	2054	0.26
29	3.58	0348	4.18	1000	1.82	1524	3.60	2154	0.60
30	3.60	0442	4.48	1118	1.31	1648	3.41	2254	0.88

TABLE 28. Moonrise and Moonset, Barking Sands, 1995

Location: W159° 47', N22° 02'

Barking Sands, Kauai, Hawaii
Rise and Set for the Moon for 1995

Hawaii-Aleutian Time

Astronomical Applications Dept.
U.S. Naval Observatory
Washington, D.C. 20392-5420

Day	Jan. Rise	Jan. Set	Feb. Rise	Feb. Set	Mar. Rise	Mar. Set	Apr. Rise	Apr. Set	May Rise	May Set	June Rise	June Set	July Rise	July Set	Aug. Rise	Aug. Set	Sept. Rise	Sept. Set	Oct. Rise	Oct. Set	Nov. Rise	Nov. Set	Dec. Rise	Dec. Set
01	0728	1855	0826	2036	0700	1917	0733	2039	0757	2105	0845	2206	0916	2207	1045	2246	1235	2358	1324		1432	0144	1433	0226
02	0821	1958	0906	2131	0740	2012	0814	2131	0823	2153	0936	2247	1008	2245	1142	2329	1335		1416	0051	1513	0240	1513	0319
03	0909	2058	0945	2224	0819	2105	0857	2221	0911	2240	1027	2327	1100	2324	1240		1433	0056	1504	0151	1553	0335	1553	0412
04	0953	2156	1024	2316	0858	2157	0941	2311	1000	2325	1119		1154		1341	0016	1528	0156	1550	0251	1633	0430	1636	0504
05	1034	2250	1102		0938	2248	1028	2358	1050		1212	0006	1250	0004	1442	0108	1620	0258	1633	0349	1713	0523	1720	0555
06	1112	2343	1142	0007	1019	2339	1116		1141	0007	1306	0045	1349	0046	1543	0204	1709	0359	1714	0446	1755	0617	1806	0646
07	1149		1224	0058	1102		1206	0045	1233	0048	1402	0125	1449	0132	1642	0304	1754	0500	1755	0542	1839	0709	1854	0735
08	1227	0035	1308	0148	1147	0029	1258	0129	1327	0123	1501	0206	1552	0222	1738	0408	1838	0600	1836	0637	1924	0801	1943	0822
09	1305	0125	1354	0238	1235	0118	1350	0212	1421	0208	1602	0252	1656	0317	1830	0512	1919	0658	1917	0732	2011	0851	2032	0907
10	1346	0216	1443	0326	1324	0205	1444	0253	1518	0249	1707	0341	1759	0418	1918	0615	2000	0754	2000	0825	2059	0939	2122	0949
11	1428	0306	1534	0414	1416	0251	1540	0334	1617	0331	1812	0436	1858	0522	2003	0716	2041	0849	2044	0918	2148	1025	2212	1029
12	1513	0356	1627	0500	1509	0336	1637	0415	1719	0415	1917	0535	1953	0627	2045	0816	2123	0943	2130	1009	2238	1109	2302	1108
13	1601	0445	1721	0544	1603	0419	1736	0457	1824	0504	2018	0639	2043	0732	2126	0913	2206	1036	2217	1058	2328	1151	2353	1146
14	1651	0534	1816	0626	1659	0501	1837	0541	1929	0557	2115	0744	2129	0834	2207	1008	2251	1127	2306	1145		1231		1224
15	1743	0621	1912	0708	1755	0542	1940	0628	2034	0655	2206	0848	2211	0934	2247	1102	2337	1217	2355	1231		1310		1302
16	1836	0706	2008	0749	1854	0624	2045	0719	2137	0756	2253	0951	2252	1031	2329	1154		1306		1314	0110	1348	0140	1343
17	1930	0749	2106	0830	1953	0707	2149	0813	2234	0900	2335	1050	2331	1126		1246	0025	1352	0046	1355	0203	1427	0236	1427
18	2025	0830	2204	0912	2055	0751	2251	0911	2326	1023		1147			0012	1336	0114	1437	0137	1435	0257	1508	0335	1515
19	2120	0910	2304	0956	2157	0839	2349	1012			0016	1241	0011	1311	0057	1425	0204	1520	0229	1515	0354	1552	0438	1608
20	2215	0950		1043	2259	0929		1113	0014	1203	0054	1334	0051	1402	0143	1513	0256	1601	0322	1555	0454	1639	0542	1706
21	2312	1030	0005	1133	0001	1023	0043	1214	0057	1259	0133	1426	0132	1453	0232	1559	0348	1641	0417	1635	0557	1731	0646	1809
22		1112	0106	1227	0059	1121	0131	1312	0137	1354	0211	1517	0215	1542	0322	1643	0441	1721	0514	1718	0701	1828	0748	1915
23	0010	1156	0206	1325	0059	1220	0216	1409	0216	1446	0252	1607	0301	1631	0413	1725	0536	1802	0613	1804	0805	1928	0845	2020
24	0110	1244	0304	1425	0154	1319	0257	1504	0254	1538	0334	1657	0348	1718	0505	1806	0631	1843	0714	1853	0907	2032	0938	2124
25	0211	1336	0358	1525	0245	1419	0336	1557	0332	1629	0418	1747	0438	1803	0558	1846	0729	1926	0817	1946	1005	2135	1027	2226
26	0313	1433	0449	1626	0332	1517	0415	1650	0411	1720	0504	1835	0528	1846	0651	1925	0828	2102	0920	2044	1058	2238	1111	2324
27	0414	1533	0536	1725	0416	1613	0453	1741	0452	1811	0552	1921	0620	1928	0745	2005	0928	2102	1021	2143	1147	2338	1153	
28	0513	1635	0619	1822	0457	1708	0531	1833	0535	1901	0642	2005	0712	2008	0841	2046	1029	2155	1119	2245	1232		1234	0020
29	0607	1738			0536	1802	0612	1924	0620	1950	0733	2047	0804	2047	0937	2129	1129	2251	1213	2346	1313	0036	1313	0115
30	0657	1839			0615	1855	0653	2015	0707	2037	0824	2128	0857	2126	1035	2215	1228	2350	1303		1354	0132	1354	0208
31	0744	1939			0654	1948			0756	2123			0951	2205	1135	2305			1349	0046			1435	0300

TABLE 29. Port Allen Tides, January 1995

January 1995

Port Allen, Hanapepe Bay, HI

21° 54.0' North, 159° 35.0' West

Tidal range, highs, and lows in feet

Alaska-Hawaii Standard Time (AHST)

Date	Range	Time	Ht	Time	Ht	Time	Ht	Time	Ht
01	2.48	0342	2.29	1054	0.03	1542	0.71	2112	-0.19
02	2.30	0418	2.22	1142	0.02	1630	0.75	2154	-0.08
03	2.06	0454	2.08	1218	0.02	1724	0.79	2248	0.07
04	1.86	0536	1.90	1254	0.04	1818	0.84	2336	0.26
05	1.62	0612	1.68	1330	0.05	1924	0.91		
06	1.37	0030	0.46	0648	1.44	1406	0.07	2036	1.01
07	1.14	0148	0.64	0724	1.21	1448	0.08	2154	1.14
08	1.23	0336	0.75	0806	1.00	1530	0.08	2306	1.30
09	1.40	0548	0.73	0906	0.82	1618	0.07	2354	1.47
10	0.64	0724	0.61	1024	0.69	1706	0.05		
11	1.58	0048	1.60	0812	0.50	1142	0.67	1754	0.01
12	1.75	0124	1.73	0848	0.39	1242	0.65	1836	-0.02
13	1.88	0154	1.83	0924	0.30	1330	0.65	1918	-0.05
14	1.97	0230	1.91	0954	0.23	1412	0.67	1954	-0.07
15	2.02	0254	1.95	1018	0.18	1454	0.70	2030	-0.07
16	2.01	0336	1.96	1048	0.14	1530	0.74	2106	-0.05
17	1.93	0354	1.94	1118	0.11	1606	0.78	2142	0.01
18	1.80	0430	1.88	1142	0.08	1654	0.84	2224	0.09
19	1.72	0506	1.77	1212	0.05	1742	0.91	2306	0.22
20	1.60	0536	1.63	1242	0.02	1836	0.99	2354	0.38
21	1.44	0612	1.44	1324	0.00	1942	1.09		
22	1.25	0112	0.54	0654	1.24	1406	-0.02	2054	1.23
23	1.44	0254	0.66	0742	1.02	1454	-0.03	2218	1.41
24	1.67	0506	0.64	0854	0.83	1554	-0.06	2324	1.61
25	0.78	0648	0.50	1024	0.69	1654	-0.09		
26	1.94	0024	1.81	0754	0.34	1154	0.65		
27	2.15	0118	1.97	0836	0.20	1254	0.66		
28	2.28	0154	2.08	0918	0.10	1354	0.72		
29	2.30	0242	2.12	0954	0.03	1448	0.79	2024	-0.19
30	2.22	0324	2.09	1030	0.00	1530	0.86	2112	-0.13
31	2.03	0354	1.99	1054	-0.01	1612	0.93	2154	-0.04

TABLE 30. Port Allen Tides, February 1995

February 1995

Port Allen, Hanapepe Bay, HI

21° 54.0' North, 159° 35.0' West

Tidal range, highs, and lows in feet

Alaska-Hawaii Standard Time (AHST)

Date	Range	Time	Ht	Time	Ht	Time	Ht	Time	Ht
01	1.85	0436	1.85	1136	0.00	1654	0.99	2242	0.09
02	1.65	0506	1.67	1206	0.01	1748	1.04	2330	0.25
03	1.43	0536	1.47	1236	0.04	1836	1.08		
04	1.20	0018	0.42	0606	1.26	1306	0.06	1936	1.13
05	1.09	0124	0.57	0642	1.07	1342	0.09	2048	1.18
06	1.15	0254	0.68	0718	0.89	1430	0.12	2206	1.27
07	1.25	0512	0.67	0812	0.73	1524	0.13	2312	1.39
08	0.60	0654	0.56	0954	0.63	1624	0.13		
09	1.42	0006	1.51	0742	0.44	1124	0.60	1724	0.10
10	1.58	0048	1.63	0818	0.34	1230	0.63	1812	0.05
11	1.72	0130	1.73	0848	0.25	1318	0.69	1854	0.00
12	1.83	0154	1.80	0912	0.18	1354	0.76	1942	-0.03
13	1.88	0236	1.83	0936	0.12	1436	0.85	2018	-0.05
14	1.87	0306	1.83	0954	0.07	1512	0.94	2054	-0.04
15	1.77	0336	1.78	1030	0.03	1554	1.03	2142	0.01
16	1.70	0406	1.69	1054	-0.01	1630	1.13	2224	0.09
17	1.60	0436	1.56	1124	-0.04	1718	1.21	2318	0.21
18	1.45	0512	1.40	1154	-0.05	1812	1.29		
19	1.40	0012	0.35	0548	1.21	1230	-0.05	1912	1.35
20	1.45	0130	0.48	0630	1.01	1312	-0.03	2024	1.42
21	1.51	0312	0.55	0724	0.81	1406	0.00	2142	1.51
22	1.60	0512	0.50	0848	0.66	1518	0.03	2254	1.63
23	1.72	0636	0.37	1036	0.60	1630	0.03	2354	1.75
24	0.65	0730	0.24	1154	0.65	1742	0.00		
25	1.88	0054	1.84	0812	0.13	1306	0.75	1842	-0.04
26	1.94	0142	1.88	0848	0.06	1354	0.86	1936	-0.06
27	1.92	0218	1.86	0918	0.01	1436	0.98	2024	-0.06
28	1.81	0254	1.79	0948	-0.02	1518	1.09	2112	-0.02

TABLE 31. Port Allen Tides, March 1995

March 1995

Port Allen, Hanapepe Bay, HI

21° 54.0' North, 159° 35.0' West

Tidal range, highs, and lows in feet

Alaska-Hawaii Standard Time (AHST)

Date	Range	Time	Ht	Time	Ht	Time	Ht	Time	Ht
01	1.70	0330	1.68	1018	-0.02	1554	1.18	2154	0.05
02	1.54	0406	1.53	1042	-0.01	1636	1.25	2242	0.15
03	1.36	0436	1.37	1106	0.00	1712	1.29	2324	0.26
04	1.28	0506	1.20	1136	0.03	1754	1.31		
05	1.24	0018	0.38	0530	1.04	1154	0.07	1848	1.31
06	1.20	0118	0.49	0606	0.89	1236	0.12	1942	1.31
07	1.15	0242	0.56	0642	0.75	1318	0.17	2054	1.32
08	1.15	0430	0.55	0748	0.64	1412	0.22	2206	1.37
09	1.20	0554	0.47	0936	0.58	1530	0.24	2306	1.44
10	1.29	0654	0.37	1112	0.61	1642	0.23	2354	1.52
11	0.51	0724	0.28	1212	0.69	1748	0.18		
12	1.46	0042	1.58	0754	0.20	1254	0.81	1842	0.12
13	1.56	0124	1.62	0818	0.12	1342	0.94	1930	0.06
14	1.60	0154	1.63	0848	0.06	1418	1.08	2012	0.03
15	1.60	0230	1.59	0912	-0.01	1454	1.23	2054	0.02
16	1.58	0306	1.52	0936	-0.06	1536	1.36	2148	0.05
17	1.58	0336	1.41	1006	-0.10	1618	1.48	2236	0.10
18	1.68	0412	1.27	1036	-0.12	1654	1.56	2330	0.19
19	1.72	0448	1.11	1112	-0.11	1748	1.61		
20	1.70	0030	0.28	0530	0.94	1148	-0.08	1848	1.62
21	1.62	0148	0.35	0624	0.77	1236	-0.01	1954	1.61
22	1.53	0324	0.37	0736	0.64	1330	0.07	2106	1.60
23	1.46	0454	0.32	0912	0.58	1448	0.15	2224	1.62
24	1.45	0606	0.22	1054	0.63	1618	0.19	2330	1.63
25	0.63	0654	0.13	1206	0.76	1736	0.17		
26	1.57	0024	1.63	0730	0.06	1254	0.92	1842	0.14
27	1.59	0112	1.60	0806	0.01	1348	1.08	1942	0.11
28	1.55	0154	1.53	0836	-0.02	1424	1.23	2030	0.10
29	1.47	0230	1.43	0854	-0.04	1454	1.35	2118	0.12
30	1.48	0254	1.31	0924	-0.04	1536	1.44	2154	0.15
31	1.54	0330	1.18	0948	-0.03	1612	1.50	2242	0.20

TABLE 32. Port Allen Tides, April 1995

April 1995

Port Allen, Hanapepe Bay, HI

21° 54.0' North, 159° 35.0' West

Tidal range, highs, and lows in feet

Alaska-Hawaii Standard Time (AHST)

Date	Range	Time	Ht	Time	Ht	Time	Ht	Time	Ht
01	1.55	0406	1.05	1012	-0.01	1648	1.53	2330	0.26
02	1.52	0436	0.93	1042	0.02	1724	1.53		
03	1.45	0018	0.32	0506	0.82	1106	0.06	1806	1.51
04	1.35	0112	0.37	0542	0.71	1142	0.12	1854	1.47
05	1.24	0224	0.40	0630	0.62	1218	0.20	1948	1.44
06	1.14	0342	0.39	0748	0.56	1312	0.27	2054	1.41
07	1.07	0454	0.34	0930	0.56	1430	0.34	2154	1.41
08	1.15	0548	0.27	1054	0.65	1554	0.36	2254	1.41
09	1.23	0624	0.19	1154	0.79	1718	0.33	2348	1.42
10	0.85	0654	0.11	1236	0.96	1818	0.27		
11	1.37	0030	1.41	0724	0.03	1318	1.15	1918	0.20
12	1.41	0112	1.37	0748	-0.04	1354	1.35	2012	0.14
13	1.65	0154	1.30	0818	-0.11	1436	1.54	2054	0.10
14	1.86	0230	1.20	0848	-0.17	1518	1.70	2154	0.08
15	2.01	0312	1.09	0924	-0.20	1554	1.81	2248	0.09
16	2.08	0354	0.96	0954	-0.20	1642	1.88	2342	0.12
17	2.05	0436	0.83	1036	-0.17	1736	1.88		
18	1.93	0048	0.16	0530	0.71	1118	-0.09	1830	1.84
19	1.74	0154	0.19	0630	0.61	1206	0.02	1924	1.76
20	1.51	0312	0.18	0754	0.57	1306	0.15	2030	1.67
21	1.43	0424	0.14	0930	0.61	1430	0.28	2136	1.57
22	1.39	0518	0.09	1054	0.75	1554	0.35	2242	1.48
23	1.35	0606	0.04	1154	0.93	1730	0.36	2342	1.39
24	1.13	0642	-0.01	1254	1.12	1842	0.33		
25	1.34	0030	1.29	0712	-0.04	1336	1.30	1942	0.29
26	1.52	0112	1.18	0742	-0.06	1412	1.45	2036	0.25
27	1.65	0154	1.07	0812	-0.08	1448	1.57	2124	0.23
28	1.74	0230	0.97	0836	-0.08	1518	1.66	2206	0.22
29	1.78	0254	0.87	0854	-0.07	1554	1.71	2248	0.22
30	1.77	0336	0.78	0930	-0.04	1624	1.73	2336	0.23

TABLE 34. Port Allen Tides, June 1995

June 1995

Port Allen, Hanapepe Bay, HI

21° 54.0' North, 159° 35.0' West

Tidal range, highs, and lows in feet

Alaska-Hawaii Standard Time (AHST)

Date	Range	Time	Ht	Time	Ht	Time	Ht	Time	Ht
01	1.66	0048	0.18	0518	0.56	1030	0.11	1748	1.77
02	1.52	0130	0.17	0612	0.57	1106	0.20	1824	1.69
03	1.44	0212	0.15	0718	0.61	1154	0.33	1906	1.58
04	1.34	0248	0.11	0830	0.70	1254	0.46	1948	1.45
05	1.24	0330	0.07	0948	0.86	1430	0.58	2042	1.31
06	1.15	0412	0.02	1054	1.07	1618	0.62	2136	1.16
07	1.37	0448	-0.05	1148	1.32	1754	0.57	2242	1.02
08	1.69	0512	-0.12	1236	1.57	1912	0.46	2342	0.90
09	2.00	0530	-0.19	1318	1.81	2018	0.33		
10	2.26	0042	0.81	0654	-0.25	1406	2.01	2112	0.21
11	2.45	0136	0.74	0736	-0.29	1448	2.16	2206	0.12
12	2.53	0236	0.70	0824	-0.29	1530	2.24	2254	0.05
13	2.50	0324	0.67	0906	-0.26	1618	2.24	2342	0.02
14	2.34	0418	0.66	0954	-0.17	1654	2.17		
15	2.08	0030	0.00	0518	0.67	1042	-0.04	1748	2.04
16	1.85	0118	0.00	0624	0.70	1130	0.13	1830	1.86
17	1.63	0154	0.01	0730	0.77	1230	0.33	1918	1.64
18	1.40	0248	0.01	0854	0.89	1348	0.52	2006	1.42
19	1.19	0330	0.01	1012	1.05	1524	0.65	2054	1.20
20	1.24	0412	0.01	1118	1.24	1718	0.68	2148	1.01
21	1.44	0454	-0.01	1212	1.43	1848	0.62	2248	0.86
22	1.61	0536	-0.02	1254	1.60	1954	0.52	2348	0.76
23	1.76	0612	-0.03	1336	1.73	2048	0.43		
24	1.88	0042	0.69	0648	-0.04	1412	1.83	2130	0.35
25	1.95	0130	0.66	0724	-0.05	1442	1.90	2206	0.29
26	1.99	0218	0.65	0754	-0.04	1512	1.95	2242	0.25
27	1.99	0254	0.65	0830	-0.03	1548	1.96	2312	0.21
28	1.94	0336	0.65	0906	0.01	1618	1.95	2342	0.19
29	1.85	0418	0.66	0936	0.06	1648	1.91		
30	1.70	0012	0.17	0454	0.69	1012	0.14	1718	1.84

TABLE 33. Port Allen Tides, May 1995

May 1995

Port Allen, Hanapepe Bay, HI

21° 54.0' North, 159° 35.0' West

Tidal range, highs, and lows in feet

Alaska-Hawaii Standard Time (AHST)

Date	Range	Time	Ht	Time	Ht	Time	Ht	Time	Ht
01	1.73	0412	0.71	0954	-0.01	1654	1.72		
02	1.64	0018	0.25	0448	0.64	1024	0.04	1736	1.69
03	1.52	0106	0.26	0530	0.58	1054	0.11	1818	1.64
04	1.38	0154	0.26	0624	0.54	1136	0.20	1854	1.57
05	1.26	0254	0.24	0736	0.54	1224	0.30	1954	1.50
06	1.22	0348	0.20	0906	0.59	1336	0.40	2048	1.43
07	1.20	0436	0.15	1024	0.72	1506	0.48	2148	1.35
08	1.19	0512	0.09	1124	0.91	1642	0.48	2242	1.27
09	1.18	0548	0.01	1212	1.13	1806	0.43	2336	1.19
10	1.44	0624	-0.07	1254	1.37	1912	0.34		
11	1.75	0024	1.10	0654	-0.14	1336	1.60	2012	0.25
12	2.02	0112	1.01	0730	-0.21	1418	1.81	2106	0.17
13	2.23	0154	0.92	0806	-0.26	1454	1.97	2154	0.10
14	2.35	0248	0.82	0848	-0.28	1548	2.07	2254	0.06
15	2.37	0336	0.74	0924	-0.26	1630	2.11	2354	0.05
16	2.27	0430	0.66	1006	-0.20	1718	2.08		
17	2.07	0048	0.05	0524	0.61	1054	-0.09	1806	1.99
18	1.80	0148	0.05	0636	0.59	1148	0.06	1854	1.85
19	1.64	0242	0.04	0754	0.62	1248	0.24	1954	1.68
20	1.47	0336	0.03	0924	0.72	1406	0.40	2054	1.50
21	1.32	0430	0.01	1042	0.89	1548	0.51	2148	1.32
22	1.18	0512	-0.02	1142	1.10	1724	0.54	2248	1.16
23	1.34	0548	-0.05	1236	1.30	1848	0.50	2342	1.02
24	1.54	0624	-0.07	1318	1.48	1954	0.43		
25	1.71	0030	0.90	0654	-0.08	1354	1.62	2048	0.36
26	1.83	0118	0.81	0724	-0.09	1430	1.73	2136	0.30
27	1.90	0154	0.73	0754	-0.09	1454	1.81	2212	0.26
28	1.93	0236	0.68	0824	-0.08	1536	1.85	2254	0.23
29	1.93	0312	0.64	0854	-0.06	1606	1.87	2330	0.20
30	1.88	0354	0.60	0924	-0.02	1636	1.86		
31	1.79	0012	0.19	0430	0.58	0954	0.03	1712	1.83

TABLE 35. Port Allen Tides, July 1994

July 1995

Port Allen, Hanapepe Bay, HI

21° 54.0' North, 159° 35.0' West

Tidal range, highs, and lows in feet

Alaska-Hawaii Standard Time (AHST)

Date	Range	Time	Ht	Time	Ht	Time	Ht	Time	Ht
01	1.59	0042	0.15	0548	0.73	1054	0.25	1748	1.74
02	1.48	0118	0.13	0642	0.80	1142	0.38	1824	1.60
03	1.34	0154	0.10	0748	0.91	1248	0.54	1906	1.44
04	1.19	0230	0.07	0854	1.06	1418	0.67	1948	1.26
05	1.24	0312	0.02	1012	1.27	1606	0.73	2048	1.07
06	1.53	0354	-0.02	1118	1.50	1754	0.66	2154	0.91
07	1.82	0448	-0.08	1212	1.74	1918	0.52	2312	0.80
08	2.09	0542	-0.13	1254	1.96	2018	0.37		
09	2.31	0024	0.74	0630	-0.18	1348	2.13	2112	0.24
10	2.46	0130	0.73	0718	-0.21	1436	2.24	2154	0.15
11	2.49	0224	0.75	0806	-0.21	1518	2.28	2236	0.08
12	2.42	0318	0.79	0854	-0.17	1554	2.25	2318	0.05
13	2.22	0406	0.83	0942	-0.07	1642	2.14	2354	0.04
14	1.91	0454	0.89	1030	0.06	1718	1.98		
15	1.72	0030	0.05	0554	0.95	1124	0.24	1754	1.77
16	1.48	0112	0.07	0654	1.02	1218	0.43	1836	1.55
17	1.23	0148	0.09	0806	1.11	1330	0.62	1918	1.32
18	1.12	0230	0.11	0924	1.23	1506	0.75	1954	1.11
19	1.25	0312	0.12	1036	1.37	1706	0.77	2054	0.93
20	1.39	0354	0.13	1136	1.52	1848	0.69	2206	0.80
21	1.54	0448	0.12	1224	1.66	1954	0.58	2324	0.73
22	1.67	0536	0.10	1306	1.78	2036	0.48		
23	1.79	0024	0.72	0624	0.08	1342	1.87	2106	0.40
24	1.88	0118	0.73	0654	0.06	1418	1.94	2136	0.34
25	1.93	0154	0.77	0742	0.05	1448	1.98	2206	0.29
26	1.93	0242	0.80	0818	0.06	1518	1.99	2230	0.25
27	1.88	0318	0.85	0854	0.09	1548	1.96	2254	0.23
28	1.77	0354	0.91	0930	0.14	1618	1.91	2324	0.20
29	1.64	0436	0.97	1012	0.22	1648	1.81	2354	0.18
30	1.36	0518	1.04	1054	0.33	1718	1.69		
31	1.37	0018	0.16	0612	1.12	1142	0.47	1748	1.53

TABLE 36. Port Allen Tides, August 1994

August 1995

Port Allen, Hanapepe Bay, HI

21° 54.0' North, 159° 35.0' West

Tidal range, highs, and lows in feet

Alaska-Hawaii Standard Time (AHST)

Date	Range	Time	Ht	Time	Ht	Time	Ht	Time	Ht
01	1.21	0054	0.14	0712	1.22	1248	0.61	1830	1.35
02	1.22	0130	0.12	0818	1.34	1418	0.73	1912	1.16
03	1.38	0218	0.11	0936	1.49	1612	0.76	2012	0.97
04	1.58	0312	0.09	1048	1.67	1806	0.66	2142	0.84
05	1.80	0418	0.06	1148	1.86	1918	0.51	2312	0.78
06	2.00	0518	0.02	1242	2.03	2006	0.38		
07	2.17	0024	0.80	0618	-0.02	1330	2.15	2048	0.27
08	2.25	0124	0.87	0712	-0.05	1418	2.21	2124	0.19
09	2.24	0218	0.96	0806	-0.05	1454	2.20	2154	0.14
10	2.12	0306	1.05	0854	-0.01	1536	2.12	2236	0.12
11	1.90	0354	1.14	0942	0.08	1612	1.98	2306	0.12
12	1.66	0442	1.21	1030	0.21	1648	1.80	2342	0.14
13	1.24	0530	1.28	1118	0.36	1724	1.60		
14	1.22	0012	0.17	0618	1.32	1212	0.52	1754	1.39
15	1.16	0048	0.20	0718	1.36	1318	0.67	1830	1.20
16	1.17	0124	0.24	0824	1.41	1448	0.77	1912	1.02
17	1.20	0206	0.28	0936	1.48	1648	0.78	2012	0.88
18	1.26	0254	0.31	1042	1.57	1824	0.70	2142	0.79
19	1.35	0354	0.31	1142	1.67	1918	0.60	2312	0.78
20	1.47	0506	0.30	1230	1.77	1954	0.51		
21	1.58	0018	0.83	0554	0.26	1312	1.85	2024	0.43
22	1.68	0106	0.89	0648	0.22	1342	1.90	2054	0.37
23	1.73	0148	0.97	0730	0.19	1418	1.92	2118	0.32
24	1.73	0224	1.06	0806	0.18	1448	1.91	2142	0.28
25	1.67	0254	1.15	0848	0.20	1518	1.86	2206	0.24
26	1.57	0336	1.25	0930	0.24	1548	1.78	2230	0.21
27	1.48	0412	1.34	1012	0.31	1618	1.66	2254	0.18
28	1.35	0454	1.43	1054	0.40	1648	1.52	2324	0.17
29	1.34	0542	1.51	1154	0.52	1724	1.35	2354	0.17
30	0.99	0636	1.57	1254	0.63	1806	1.18		
31	1.44	0042	0.18	0742	1.63	1436	0.71	1854	1.01

TABLE 37. Port Allen Tides, September 1995

September 1995

Port Allen, Hanapepe Bay, HI

21° 54.0' North, 159° 35.0' West

Tidal range, highs, and lows in feet

Alaska-Hawaii Standard Time (AHST)

Date	Range	Time	Ht	Time	Ht	Time	Ht	Time	Ht
01	1.48	0130	0.22	0854	1.70	1624	0.68	2012	0.87
02	1.55	0236	0.25	1018	1.79	1754	0.58	2154	0.81
03	1.64	0354	0.26	1124	1.90	1854	0.45	2330	0.86
04	1.76	0506	0.23	1218	1.99	1936	0.34		
05	1.84	0036	0.97	0612	0.19	1306	2.04	2012	0.26
06	1.87	0124	1.10	0712	0.16	1354	2.03	2048	0.20
07	1.81	0212	1.24	0806	0.15	1430	1.96	2118	0.17
08	1.69	0254	1.37	0854	0.18	1512	1.85	2148	0.16
09	1.53	0336	1.47	0942	0.24	1542	1.70	2218	0.17
10	1.36	0418	1.55	1030	0.34	1618	1.53	2242	0.20
11	1.37	0454	1.60	1118	0.44	1648	1.36	2312	0.23
12	1.34	0542	1.62	1212	0.56	1724	1.19	2342	0.28
13	0.96	0630	1.61	1312	0.65	1754	1.04		
14	1.26	0018	0.33	0724	1.59	1436	0.71	1842	0.92
15	1.19	0054	0.40	0830	1.58	1618	0.70	1954	0.82
16	1.14	0154	0.46	0942	1.60	1736	0.64	2142	0.80
17	1.15	0312	0.49	1048	1.64	1830	0.55	2306	0.85
18	1.22	0430	0.49	1136	1.70	1854	0.47		
19	1.34	0006	0.95	0536	0.45	1224	1.74	1930	0.40
20	1.43	0048	1.07	0630	0.40	1254	1.76	1954	0.34
21	1.48	0124	1.20	0718	0.35	1336	1.75	2024	0.28
22	1.49	0154	1.34	0754	0.32	1412	1.71	2048	0.22
23	1.46	0236	1.48	0848	0.30	1442	1.64	2112	0.18
24	1.47	0312	1.61	0930	0.32	1518	1.54	2136	0.14
25	1.61	0354	1.73	1018	0.35	1548	1.41	2206	0.12
26	1.69	0436	1.81	1112	0.41	1624	1.27	2236	0.12
27	1.71	0524	1.86	1212	0.49	1706	1.12	2318	0.15
28	1.67	0618	1.88	1318	0.55	1754	0.97	2354	0.21
29	1.30	0718	1.87	1448	0.56	1854	0.85		
30	1.55	0054	0.30	0824	1.85	1618	0.52	2036	0.79

TABLE 38. Port Allen Tides, October 1995

October 1995

Port Allen, Hanapepe Bay, HI

21° 54.0' North, 159° 35.0' West

Tidal range, highs, and lows in feet

Alaska-Hawaii Standard Time (AHST)

Date	Range	Time	Ht	Time	Ht	Time	Ht	Time	Ht
01	1.46	0206	0.38	0942	1.84	1724	0.43	2224	0.85
02	1.51	0336	0.44	1048	1.84	1818	0.34	2336	0.99
03	1.58	0454	0.43	1148	1.83	1854	0.26		
04	1.60	0036	1.16	0618	0.40	1236	1.79	1930	0.20
05	1.56	0124	1.34	0718	0.36	1324	1.72	2006	0.16
06	1.48	0206	1.51	0812	0.34	1354	1.61	2030	0.14
07	1.52	0242	1.65	0854	0.34	1442	1.48	2054	0.13
08	1.61	0318	1.75	0948	0.36	1512	1.35	2124	0.15
09	1.65	0354	1.82	1036	0.40	1548	1.21	2154	0.17
10	1.63	0430	1.84	1124	0.45	1618	1.08	2218	0.21
11	1.57	0512	1.84	1212	0.51	1654	0.97	2248	0.27
12	1.46	0548	1.80	1306	0.55	1730	0.87	2318	0.34
13	1.33	0636	1.75	1418	0.58	1824	0.79	2354	0.42
14	1.13	0730	1.69	1530	0.56	1948	0.75		
15	1.13	0048	0.51	0830	1.64	1636	0.51	2130	0.78
16	1.16	0206	0.59	0936	1.61	1724	0.44	2254	0.88
17	1.22	0342	0.63	1036	1.59	1754	0.37	2348	1.03
18	1.27	0454	0.61	1124	1.57	1830	0.30		
19	1.31	0030	1.20	0606	0.55	1212	1.54	1854	0.23
20	1.33	0106	1.38	0705	0.48	1248	1.49	1924	0.16
21	1.48	0142	1.57	0754	0.42	1330	1.42	1954	0.10
22	1.72	0218	1.76	0848	0.36	1406	1.33	2024	0.04
23	1.92	0254	1.92	0936	0.33	1448	1.23	2054	0.00
24	2.05	0336	2.04	1030	0.32	1524	1.11	2124	-0.01
25	2.10	0418	2.11	1124	0.33	1606	1.00	2154	0.01
26	2.05	0506	2.13	1224	0.35	1654	0.89	2242	0.08
27	1.91	0554	2.09	1324	0.37	1754	0.79	2330	0.18
28	1.66	0654	2.01	1436	0.36	1912	0.75		
29	1.59	0030	0.32	0754	1.91	1548	0.32	2054	0.78
30	1.54	0142	0.46	0854	1.80	1642	0.26	2224	0.92
31	1.49	0324	0.57	1006	1.68	1730	0.20	2336	1.11

TABLE 39. Port Allen Tides, November 1995

November 1995

Port Allen, Hanapepe Bay, HI

21° 54.0' North, 159° 35.0' West

Tidal range, highs, and lows in feet

Alaska-Hawaii Standard Time (AHST)

Date	Range	Time	Ht	Time	Ht	Time	Ht	Time	Ht
01	1.44	0454	0.59	1106	1.57	1812	0.14		
02	1.36	0030	1.33	0618	0.55	1154	1.46	1848	0.10
03	1.46	0112	1.53	0724	0.50	1248	1.34	1918	0.07
04	1.64	0154	1.70	0824	0.44	1330	1.22	1948	0.05
05	1.78	0230	1.83	0912	0.40	1406	1.11	2018	0.05
06	1.85	0306	1.92	0954	0.38	1442	1.01	2042	0.06
07	1.88	0336	1.97	1042	0.38	1518	0.92	2106	0.09
08	1.85	0412	1.98	1124	0.38	1554	0.84	2136	0.13
09	1.77	0448	1.96	1206	0.39	1630	0.78	2206	0.19
10	1.65	0524	1.91	1254	0.40	1712	0.73	2236	0.26
11	1.48	0554	1.84	1348	0.40	1812	0.69	2312	0.36
12	1.38	0642	1.76	1442	0.39	1924	0.69	2354	0.47
13	1.32	0730	1.67	1530	0.35	2054	0.75		
14	1.27	0106	0.59	0824	1.57	1618	0.30	2218	0.88
15	1.23	0242	0.69	0918	1.47	1654	0.24	2318	1.06
16	1.21	0424	0.71	1018	1.38	1730	0.17	2354	1.28
17	1.19	0548	0.66	1112	1.28	1754	0.09		
18	1.49	0042	1.51	0654	0.57	1154	1.19	1836	0.01
19	1.79	0124	1.73	0754	0.46	1248	1.10	1906	-0.06
20	2.06	0154	1.94	0854	0.36	1336	1.02	1942	-0.12
21	2.27	0242	2.11	0942	0.28	1424	0.93	2018	-0.16
22	2.38	0324	2.23	1036	0.22	1512	0.86	2054	-0.16
23	2.39	0406	2.28	1124	0.19	1554	0.80	2142	-0.11
24	2.28	0454	2.26	1218	0.18	1654	0.75	2224	-0.02
25	2.05	0536	2.18	1312	0.17	1754	0.72	2312	0.13
26	1.89	0630	2.04	1406	0.16	1912	0.74		
27	1.73	0012	0.30	0718	1.87	1506	0.14	2042	0.82
28	1.56	0124	0.49	0818	1.67	1554	0.11	2206	0.99
29	1.39	0306	0.64	0918	1.47	1642	0.08	2318	1.20
30	1.24	0454	0.69	1018	1.28	1724	0.05		

TABLE 40. Port Allen Tides, December 1995

December 1995

Port Allen, Hanapepe Bay, HI

21° 54.0' North, 159° 35.0' West

Tidal range, highs, and lows in feet

Alaska-Hawaii Standard Time (AHST)

Date	Range	Time	Ht	Time	Ht	Time	Ht	Time	Ht
01	1.40	0012	1.42	0624	0.64	1118	1.12	1754	0.02
02	1.62	0054	1.61	0736	0.55	1212	0.99	1836	-0.01
03	1.79	0142	1.77	0836	0.46	1254	0.89	1906	-0.02
04	1.92	0218	1.89	0924	0.39	1342	0.82	1942	-0.02
05	1.98	0248	1.97	1006	0.34	1424	0.76	2012	-0.02
06	2.00	0324	2.00	1042	0.30	1454	0.73	2042	0.00
07	1.97	0354	2.01	1118	0.28	1536	0.70	2112	0.04
08	1.89	0424	1.99	1154	0.26	1618	0.68	2142	0.09
09	1.77	0454	1.94	1230	0.25	1654	0.67	2212	0.17
10	1.63	0530	1.87	1306	0.24	1748	0.67	2248	0.27
11	1.55	0606	1.78	1348	0.23	1848	0.69	2336	0.40
12	1.45	0642	1.66	1424	0.20	2006	0.77		
13	1.35	0030	0.54	0724	1.51	1506	0.17	2124	0.90
14	1.23	0154	0.68	0806	1.35	1542	0.12	2236	1.09
15	1.27	0348	0.75	0906	1.19	1624	0.06	2330	1.33
16	1.06	0536	0.70	1006	1.04	1706	-0.01		
17	1.67	0018	1.57	0654	0.58	1112	0.92	1748	-0.09
18	1.98	0054	1.81	0806	0.44	1218	0.83	1830	-0.17
19	2.25	0148	2.02	0854	0.30	1312	0.78	1918	-0.23
20	2.45	0230	2.19	0942	0.19	1406	0.75	1954	-0.26
21	2.54	0312	2.29	1030	0.11	1454	0.74	2042	-0.25
22	2.51	0354	2.31	1112	0.06	1554	0.74	2130	-0.19
23	2.34	0436	2.26	1154	0.03	1648	0.75	2218	-0.08
24	2.12	0518	2.14	1242	0.02	1748	0.78	2306	0.08
25	1.93	0554	1.96	1324	0.02	1854	0.83		
26	1.70	0006	0.28	0648	1.73	1412	0.03	2006	0.92
27	1.45	0112	0.49	0730	1.48	1454	0.03	2130	1.07
28	1.22	0248	0.66	0824	1.24	1542	0.03	2248	1.25
29	1.42	0448	0.71	0918	1.02	1630	0.02	2348	1.44
30	0.85	0636	0.65	1030	0.85	1712	0.00		
31	1.63	0042	1.61	0748	0.53	1136	0.74	1754	-0.01

Appendix A

Appendix A

HEIGHT OF THE TIDE AT ANY TIME

The height of the tide at times intermediate to the times of high and low water is needed on occasion, and may be computed by numerical methods. An example of the method, (adapted from Table 3 of the data source), is presented here, using the predicted tides for a day at Point Mugu.

Problem: Given that the predicted times and heights of the tides are:

TIME	HEIGHT
0039	4.9
0814	0.2
1510	3.1
1933	2.4

What is the height of the tide at 0300?

Numerical Method

The duration of fall is 08h 14m - 00h 39m = 7h 35m

The time after high water is 03h 00m - 00h 39m = 2h 21m

The range of tide is 4.9 - 0.2 = 4.7 feet

Entering Table A-1 at the duration of fall of 7h 40m, which is the nearest value to 6h 35m, the nearest value on the horizontal line to 2h 21m is 2h 18m after high water. Following down this column to its intersection with a range of 4.5 feet which is the nearest value to 4.7 feet, one obtains 0.9 which, being calculated from high water, must be subtracted from 4.9. The approximate height at 0300 is therefore 4.0 feet.

When the duration of rise or fall is greater than 10h 40m, enter the table with one-half the given duration and with one-half the time from nearest high or low water; but if the duration of rise or fall is less than 4h 00m, enter the table with double the given duration and time.

TABLE A-1. Height of the Tide at Any Time

Duration of rise or fall, see footnote

h.m.	Time from the nearest high water or low water														
h.m.	h.m.	h.m.	h.m.	h.m.	h.m.	h.m.	h.m.	h.m.	h.m.	h.m.	h.m.	h.m.	h.m.	h.m.
4 00	0 08	0 16	0 24	0 32	0 40	0 48	0 56	1 04	1 12	1 20	1 28	1 36	1 44	1 52	2 00
4.20	0 09	0 17	0 26	0 35	0 43	0 52	1 01	1 09	1 18	1 27	1 35	1 44	1 53	2 01	2 10
4.40	0 09	0 19	0 28	0 37	0 47	0 56	1 05	1 15	1 24	1 33	1 43	1 52	2 01	2 11	2 20
5 00	0 10	0 20	0 30	0 40	0 50	1 00	1 10	1 20	1 30	1 40	1 50	2 00	2 10	2 20	2 30
5 20	0 11	0 21	0 32	0 43	0 53	1 04	1 15	1 25	1 36	1 47	1 57	2 08	2 19	2 29	2 40
5 40	0 11	0 23	0 34	0 45	0 57	1 08	1 19	1 31	1 42	1 53	2 05	2 16	2 27	2 39	2 50
6 00	0 12	0 24	0 36	0 48	1 00	1 12	1 24	1 36	1 48	2 00	2 12	2 24	2 36	2 48	3 00
6 20	0 13	0 25	0 38	0 51	1 03	1 16	1 29	1 41	1 54	2 07	2 19	2 32	2 45	2 57	3 10
6 40	0 13	0 27	0 40	0 53	1 07	1 20	1 33	1 47	2 00	2 13	2 27	2 40	2 53	3 07	3 20
7 00	0 14	0 28	0 42	0 56	1 10	1 24	1 38	1 52	2 06	2 20	2 34	2 48	3 02	3 16	3 30
7 20	0 15	0 29	0 44	0 59	1 13	1 28	1 43	1 57	2 12	2 27	2 41	2 56	3 11	3 25	3 40
7 40	0 15	0 31	0 46	1 01	1 17	1 32	1 47	2 03	2 18	2 33	2 49	3 04	3 19	3 35	3 50
8 00	0 16	0 32	0 48	1 04	1 20	1 36	1 52	2 08	2 24	2 40	2 56	3 12	3 28	3 44	4 00
8 20	0 17	0 33	0 50	1 07	1 23	1 40	1 57	2 13	2 30	2 47	3 03	3 20	3 37	3 53	4 10
8 40	0 17	0 35	0 52	1 09	1 27	1 44	2 01	2 19	2 36	2 53	3 11	3 28	3 45	4 03	4 20
9 00	0 18	0 36	0 54	1 12	1 30	1 48	2 06	2 24	2 42	3 00	3 18	3 36	3 54	4 12	4 30
9 20	0 19	0 37	0 56	1 15	1 33	1 52	2 11	2 29	2 48	3 07	3 25	3 44	4 03	4 21	4 40
9 40	0 19	0 39	0 58	1 17	1 37	1 56	2 15	2 35	2 54	3 13	3 33	3 52	4 11	4 31	4 50
10 00	0 20	0 40	1 00	1 20	1 40	2 00	2 20	2 40	3 00	3 20	3 40	4 00	4 20	4 40	5 00
10 20	0 21	0 41	1 02	1 23	1 43	2 04	2 25	2 45	3 06	3 27	3 47	4 08	4 29	4 49	5 10
10 40	0 21	0 43	1 04	1 25	1 47	2 08	2 29	2 51	3 12	3 33	3 55	4 16	4 37	4 59	5 20

Range of tide, see footnote — Correction to Height

Ft.	Ft.	Ft.	Ft.	Ft.	Ft.	Ft.	Ft.	Ft.	Ft.	Ft.	Ft.	Ft.	Ft.	Ft.	Ft.
0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
1.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.4	0.5
1.5	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.6	0.7	0.8
2.0	0.0	0.0	0.0	0.1	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
2.5	0.0	0.0	0.1	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.7	0.9	1.0	1.1	1.2
3.0	0.0	0.0	0.1	0.1	0.2	0.3	0.4	0.5	0.6	0.8	0.9	1.0	1.2	1.3	1.5
3.5	0.0	0.0	0.1	0.2	0.2	0.3	0.4	0.6	0.7	0.9	1.0	1.2	1.4	1.6	1.8
4.0	0.0	0.0	0.1	0.2	0.3	0.4	0.5	0.7	0.8	1.0	1.2	1.4	1.6	1.8	2.0
4.5	0.0	0.0	0.1	0.2	0.3	0.4	0.6	0.7	0.9	1.1	1.3	1.6	1.8	2.0	2.2
5.0	0.0	0.1	0.1	0.2	0.3	0.5	0.6	0.8	1.0	1.2	1.5	1.7	2.0	2.2	2.5
5.5	0.0	0.1	0.1	0.2	0.4	0.5	0.7	0.9	1.1	1.4	1.6	1.9	2.2	2.5	2.8
6.0	0.0	0.1	0.1	0.3	0.4	0.6	0.8	1.0	1.2	1.5	1.8	2.1	2.4	2.7	3.0
6.5	0.0	0.1	0.2	0.3	0.4	0.6	0.8	1.1	1.3	1.6	1.9	2.2	2.6	2.9	3.2
7.0	0.0	0.1	0.2	0.3	0.5	0.7	0.9	1.2	1.4	1.8	2.1	2.4	2.8	3.1	3.5
7.5	0.0	0.1	0.2	0.3	0.5	0.7	1.0	1.2	1.5	1.9	2.2	2.6	3.0	3.4	3.8
8.0	0.0	0.1	0.2	0.3	0.5	0.8	1.0	1.3	1.6	2.0	2.4	2.8	3.2	3.6	4.0
8.5	0.0	0.1	0.2	0.4	0.6	0.8	1.1	1.4	1.8	2.1	2.5	2.9	3.4	3.8	4.2
9.0	0.0	0.1	0.2	0.4	0.6	0.9	1.2	1.5	1.9	2.2	2.7	3.1	3.6	4.0	4.5
9.5	0.0	0.1	0.2	0.4	0.6	0.9	1.2	1.6	2.0	2.4	2.8	3.3	3.8	4.3	4.8
10.0	0.0	0.1	0.2	0.4	0.7	1.0	1.3	1.7	2.1	2.5	3.0	3.5	4.0	4.5	5.0
10.5	0.0	0.1	0.3	0.5	0.7	1.0	1.3	1.7	2.2	2.6	3.1	3.6	4.2	4.7	5.2
11.0	0.0	0.1	0.3	0.5	0.7	1.1	1.4	1.8	2.3	2.8	3.3	3.8	4.4	4.9	5.5
11.5	0.0	0.1	0.3	0.5	0.8	1.1	1.5	1.9	2.4	2.9	3.4	4.0	4.6	5.1	5.8
12.0	0.0	0.1	0.3	0.5	0.8	1.1	1.5	2.0	2.5	3.0	3.6	4.1	4.8	5.4	6.0
12.5	0.0	0.1	0.3	0.5	0.8	1.2	1.6	2.1	2.6	3.1	3.7	4.3	5.0	5.6	6.2
13.0	0.0	0.1	0.3	0.6	0.9	1.2	1.7	2.2	2.7	3.2	3.9	4.5	5.1	5.8	6.5
13.5	0.0	0.1	0.3	0.6	0.9	1.3	1.7	2.2	2.8	3.4	4.0	4.7	5.3	6.0	6.8
14.0	0.0	0.2	0.3	0.6	0.9	1.3	1.8	2.3	2.9	3.5	4.2	4.8	5.5	6.3	7.0
14.5	0.0	0.2	0.4	0.6	1.0	1.4	1.9	2.4	3.0	3.6	4.3	5.0	5.7	6.5	7.2
15.0	0.0	0.2	0.4	0.6	1.0	1.4	1.9	2.5	3.1	3.8	4.4	5.2	5.9	6.7	7.5
15.5	0.0	0.2	0.4	0.7	1.0	1.5	2.0	2.6	3.2	3.9	4.6	5.4	6.1	6.9	7.8
16.0	0.0	0.2	0.4	0.7	1.1	1.5	2.1	2.6	3.3	4.0	4.7	5.5	6.3	7.2	8.0
16.5	0.0	0.2	0.4	0.7	1.1	1.6	2.1	2.7	3.4	4.1	4.9	5.7	6.5	7.4	8.2
17.0	0.0	0.2	0.4	0.7	1.1	1.6	2.2	2.8	3.5	4.2	5.0	5.9	6.7	7.6	8.5
17.5	0.0	0.2	0.4	0.8	1.2	1.7	2.2	2.9	3.6	4.4	5.2	6.0	6.9	7.8	8.8
18.0	0.0	0.2	0.4	0.8	1.2	1.7	2.3	3.0	3.7	4.5	5.3	6.2	7.1	8.1	9.0
18.5	0.1	0.2	0.5	0.8	1.2	1.8	2.4	3.1	3.8	4.6	5.5	6.4	7.3	8.3	9.2
19.0	0.1	0.2	0.5	0.8	1.3	1.8	2.4	3.1	3.9	4.8	5.6	6.6	7.5	8.5	9.5
19.5	0.1	0.2	0.5	0.8	1.3	1.9	2.5	3.2	4.0	4.9	5.8	6.7	7.7	8.7	9.8
20.0	0.1	0.2	0.5	0.9	1.3	1.9	2.6	3.3	4.1	5.0	5.9	6.9	7.9	9.0	10.0

1. Obtain from the predictions the high water and low water, one of which is before and the other after the time for which the height is required. The difference between the times of occurrence of these tides is the duration of rise or fall, and the difference between heights is the range of tide for the above table. Find the difference between the nearest high or low water and the time for which the height is required.

2. Enter the table with the duration of rise or fall, printed in heavy-faced type, which most nearly agrees with the actual value, and on that horizontal line find the time from the nearest high or low water which agrees most nearly with the corresponding actual difference. The correction sought is in the column directly below on the line with the range of tide.

3. When the nearest tide is high water, subtract the correction.

4. When the nearest tide is low water, add the correction.

GRAPHICAL METHOD

If the height of the tide is required for a number of times on a certain day the fill tide curve for the day, may be obtained by the *one-quarter, one-tenth rule*. The procedure is as follows:

1. On cross-section paper plot the high and low water points in the order of their occurrence for the day, measuring time horizontally and height vertically. These are the basic points for the curve.

2. Draw light straight lines connecting the points representing successive high and low waters.

3. Divide each of these straight lines into four equal parts. The halfway point of each line gives another point for the curve.

4. At the quarter point adjacent to high water, draw a vertical line above the point, and at the quarter point adjacent to low water, draw a vertical line below the point, making the length of these lines equal to one-tenth of the range between the high and low waters used. The points marking the ends of these vertical lines give two additional intermediate points for the curve.

5. Draw a smooth curve through the points of high and low waters and the intermediate points, making the curve well rounded near high and low waters. This curve will approximate the actual tide curve and heights for any time of the day may be readily scaled from it. The resulting graph is shown in Figure A-1.

CAUTION

Both methods presented are based on the assumption that the rise and fall conform to simple cosine curves. Therefore the heights obtained will be approximate. The roughness of approximation will vary as the tide curve differs from a cosine curve.
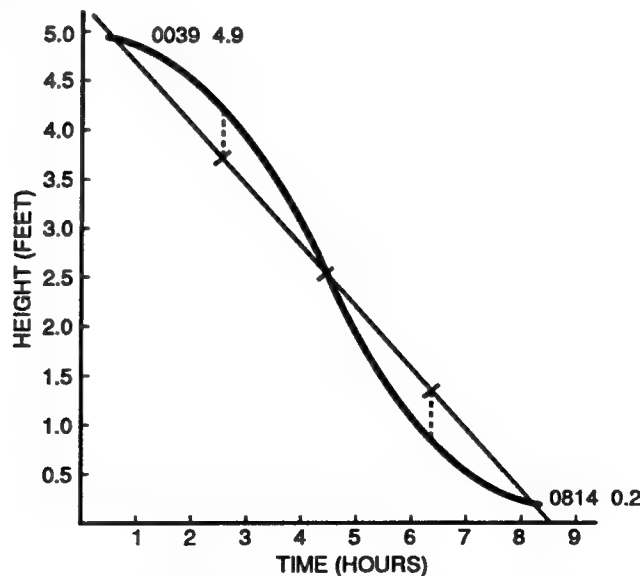
FIGURE A-1. Tidal Curve for Solution of the Problem.

A-3

Appendix B

Appendix B
EQUINOXES, SOLSTICES, AND LUNAR PHASES 1995

The dates and times for Vernal and Autumnal Equinoxes and Summer and Winter Solstices during 1995 are listed in Table B-1. The 1995 dates and times for phases of the moon are given in Table B-2. Times are Pacific Standard Time, add 1 hour when Daylight Savings Time is in effect; add 2 hours for times in the Barking Sands area.

TABLE B-1. Equinoxes and Solstices, 1995, Point Mugu Area

Vernal Equinox	20 March	1814 PST	Beginning of Spring
			Day and night equal length
Summer Solstice	21 June	1234 PST	Beginning of Summer
			Greatest duration daylight
Autumnal Equinox	23 September	0413 PST	Beginning of Autumn
			Day and night equal length
Winter Solstice	22 December	0017 PST	Beginning of Winter
			Greatest duration darkness

TABLE B-2. Lunar Phases, 1995, Point Mugu Area

	JANUARY DATE	JANUARY TIME	FEBRUARY DATE	FEBRUARY TIME	MARCH DATE	MARCH TIME	APRIL DATE	APRIL TIME
First Quarter	8	0746	7	0454	9	0214	7	2135
Full Moon	16	1226	15	0415	16	1726	15	0408
Last Quarter	23	2058	22	0504	23	1210	21	1918
New Moon	30	1448	--	--	30	1809	29	0936
New Moon	1	0256	--	--	1	0348	--	--

	MAY DATE	MAY TIME	JUNE DATE	JUNE TIME	JULY DATE	JULY TIME	AUGUST DATE	AUGUST TIME
First Quarter	7	1344	6	0226	5	1202	3	1916
Full Moon	14	1248	12	2003	12	0249	10	1015
Last Quarter	21	0336	19	1401	19	0310	17	1904
New Moon	29	0127	27	1650	27	0713	25	2031

	SEPTEMBER DATE	SEPTEMBER TIME	OCTOBER DATE	OCTOBER TIME	NOVEMBER DATE	NOVEMBER TIME	DECEMBER DATE	DECEMBER TIME
First Quarter	2	0103	1	0636	--	--	--	--
Full Moon	8	1937	8	0752	6	2320	6	1727
Last Quarter	16	1309	16	0826	15	0340	14	2131
New Moon	24	0855	23	2036	22	0743	21	1822
First Quarter	--	--	30	1317	28	2228	28	1106

Because the earth's period of revolution about the sun (365.24+ days) is not evenly divisible by the moon's period of revolution about the earth (27.321 days), the dates and times of lunar phases, moonrise and moonset, and tidal data must be recomputed for each year. The following information, however, is based on geometrical relationships and holds true for all times:

1. The New Moon rises at sunrise, crosses the meridian at noon, and sets at sunset.

2. The First Quarter Moon rises at noon, crosses the meridian at sunset, and sets at sunrise.

3. The Full Moon rises at sunset, crosses the meridian at midnight, and sets at sunrise.

4. The Last Quarter Moon rises at midnight, crosses the meridian at sunrise and sets at noon.

Appendix C

Sunrise, Sunset, and Duration of Twilight for Point Mugu, CA.
34°07′ N. 119°07′ W
(January to June)

Note: All times are Pacific Standard Time. (120th meridian):
Add 1 hour when Daylight Savings Time is in effect.

Date	January Sunrise	January Sunset	February Sunrise	February Sunset	March Sunrise	March Sunset	April Sunrise	April Sunset	May Sunrise	May Sunset	June Sunrise	June Sunset	Date
1	0702	1658	0654	1727	0626	1753	0544	1817	0507	1840	0446	1903	1
2	0703	1659	0653	1728	0624	1753	0543	1818	0506	1841	0446	1903	2
3	0703	1700	0652	1729	0623	1754	0541	1819	0505	1842	0445	1904	2
3	0703	1700	0652	1730	0622	1755	0540	1819	0504	1843	0445	1904	3
4	0703	1700	0652	1730	0622	1755	0540	1819	0504	1843	0445	1904	4
5	0703	1701	0651	1731	0621	1756	0539	1820	0503	1843	0445	1905	5
6	0703	1702	0650	1732	0619	1757	0537	1821	0502	1844	0445	1905	6
7	0703	1703	0649	1733	0618	1758	0536	1822	0502	1845	0445	1906	7
8	0703	1704	0648	1734	0617	1758	0535	1822	0501	1846	0444	1906	8
9	0703	1705	0647	1734	0615	1759	0533	1823	0500	1846	0444	1907	9
10	0703	1705	0647	1735	0614	1800	0532	1824	0459	1847	0444	1907	10
11	0703	1706	0646	1736	0613	1801	0531	1825	0458	1848	0444	1908	11
12	0703	1707	0645	1737	0611	1802	0530	1825	0457	1849	0444	1908	12
13	0703	1708	0644	1738	0610	1802	0528	1826	0456	1849	0444	1909	13
14	0702	1709	0643	1739	0609	1803	0527	1827	0456	1850	0444	1909	14
15	0702	1710	0642	1740	0607	1804	0526	1828	0455	1851	0444	1909	15
16	0702	1711	0641	1741	0606	1805	0525	1829	0454	1852	0444	1910	16
17	0702	1712	0640	1742	0605	1806	0523	1829	0453	1852	0444	1910	17
18	0701	1713	0638	1743	0603	1806	0522	1830	0453	1853	0445	1910	18
19	0701	1714	0637	1744	0602	1807	0521	1831	0452	1854	0445	1911	19
20	0701	1715	0636	1745	0601	1808	0520	1832	0451	1855	0445	1911	20
21	0700	1716	0635	1746	0559	1809	0518	1832	0451	1844	0445	1911	21
22	0700	1717	0634	1747	0558	1809	0517	1833	0450	1856	0445	1911	22
23	0659	1718	0633	1747	0556	1810	0516	1834	0450	1857	0446	1911	23
24	0659	1719	0632	1748	0555	1811	0515	1835	0449	1857	0446	1912	24
25	0658	1720	0630	1749	0554	1812	0514	1835	0449	1858	0446	1912	25
26	0658	1721	0629	1750	0552	1813	0513	1836	0448	1859	0446	1912	26
27	0657	1722	0628	1751	0551	1813	0512	1837	0448	1900	0447	1912	27
28	0657	1723	0627	1752	0550	1814	0511	1838	0447	1900	0447	1912	28
29	0656	1724	0626	1752	0548	1815	0509	1839	0447	1901	0447	1912	29
30	0655	1725			0547	1816	0508	1839	0447	1901	0448	1912	30
31	0655	1726			0546	1816			0446	1902			31

	January	February	March	April	May	June
Average Twilight Civil:	27 min.	26 min.	25 min.	26 min.	28 min.	29 min.
Nautical:	58 min	55 min.	54 min.	57 min.	61 min.	65 min.

Retain for use in future years. These data valid through 2020.

TABLE C-2 Sunrise and Sunset for Point Mugu (July-December)

Sunset, Sunset, and Duration of Twilight for Point Mugu, CA.
34°07′ N. 119°07 W
(July to December)

Note: All times are Pacific Standard Time (120th meridian):
add 1 hour when Daylight Savings Time is in effect:

Date	July Sun-rise	July Sun-set	August Sun-rise	August Sun-set	September Sun-rise	September Sun-set	October Sun-rise	October Sun-set	November Sun-rise	November Sun-set	December Sun-rise	December Sun-set	Date
1	0448	1912	0507	1858	0530	1823	0551	1741	0616	1704	0644	1647	1
2	0449	1912	0508	1857	0530	1821	0551	1740	0617	1703	0645	1647	2
3	0449	1912	0509	1856	0531	1820	0552	1738	0618	1702	0646	1647	3
4	0450	1912	0510	1855	0532	1819	0553	1737	0619	1701	0646	1647	4
5	0450	1912	0510	1854	0532	1817	0554	1736	0620	1700	0647	1647	5
6	0451	1911	0511	1853	0533	1816	0554	1734	0621	1659	0648	1647	6
7	0451	1911	0512	1852	0534	1815	0555	1733	0621	1658	0649	1647	7
8	0452	1911	0512	1851	0535	1813	0556	1732	0622	1658	0650	1647	8
9	0452	1911	0513	1850	0535	1812	0557	1730	0623	1657	0650	1647	9
10	0453	1910	0514	1849	0536	1810	0557	1729	0624	1656	0651	1647	10
11	0453	1910	0515	1848	0537	1809	0558	1728	0625	1655	0652	1647	11
12	0454	1910	0515	1847	0537	1808	0559	1726	0626	1655	0653	1648	12
13	0454	1909	0516	1846	0538	1806	0600	1725	0627	1654	0653	1648	13
14	0455	1909	0517	1845	0539	1805	1601	1724	0628	1653	0654	1648	14
15	0456	1909	0518	1844	0539	1803	0601	1723	0629	1653	0655	1648	15
16	0456	1908	0518	1843	0540	1802	0602	1721	0630	1652	0655	1649	16
17	0457	1908	0519	1841	0541	1801	0603	1720	0631	1652	0656	1649	17
18	0458	1907	0520	1840	0541	1759	0604	1719	0632	1651	0657	1650	18
19	0458	1907	0520	1839	0542	1758	0605	1718	0633	1651	0657	1650	19
20	0459	1906	0521	1838	0543	1756	0606	1717	0634	1650	0658	1650	20
21	0500	1905	0522	1837	0544	1755	0606	1715	0635	1650	0658	1651	21
22	0500	1905	0523	1835	0544	1754	0607	1714	0636	1649	0659	1651	22
23	0501	1904	0523	1834	0545	1752	0608	1713	0637	1649	0659	1652	23
24	0502	1904	0524	1833	0546	1751	0609	1712	0637	1649	0700	1653	24
25	0502	1903	0525	1832	0546	1749	0610	1711	0638	1648	0700	1653	25
26	0503	1902	0525	1830	0547	1748	0611	1710	0639	1648	0700	1654	26
27	0504	1902	0526	1829	0548	1747	0611	1709	0640	1648	0701	1654	27
28	0504	1901	0527	1828	0549	1745	0612	1708	0641	1647	0701	1655	28
29	0505	1900	0528	1827	0549	1744	0613	1707	0642	1647	0702	1656	29
30	0506	1859	0528	1825	0550	1742	0614	1706	0643	1647	0702	1656	30
31	0507	1858	0529	1824			0615	1705			0702	1657	31

Average Twilight Civil: 29 min. Nautical: 63 min.	Average Twilight Civil: 26 min. Nautical: 58 min.	Average Twilight Civil: 25 min. Nautical: 55 min.	Average Twilight Civil: 25 min. Nautical: 54 min.	Average Twilight Civil: 27 min. Nautical: 57 min.	Average Twilight Civil: 28 min. Nautical: 59 min.

Retain for use in future years. These data valid through 2020.

TABLE C-3 Sunrise and Sunset for Barking Sands (January-June)

Sunrise, Sunset, and Duration of Twilight for Barking Sands, Kauai, HI
(January to June)
22°02′ N, 159°47′ W

Note: All times are Alaska-Hawaii Standard Time. (150th Meridian)

Date	January Sun-rise	Sun-set	February Sun-rise	Sun-set	March Sun-rise	Sun-set	April Sun-rise	Sun-set	May Sun-rise	Sun-set	June Sun-rise	Sun-set	Date
1	0718	1807	0718	1828	0700	1843	0632	1854	0607	1905	0555	1919	1
2	0719	1808	0717	1829	0659	1843	0631	1855	0607	1906	0555	1919	2
3	0719	1809	0717	1830	0659	1844	0630	1855	0606	1906	0555	1920	3
4	0719	1809	0716	1830	0658	1844	0629	1855	0606	1906	0555	1920	4
5	0719	1810	0716	1831	0657	1845	0628	1856	0605	1907	0555	1920	5
6	0720	1811	0715	1831	0656	1845	0627	1856	0604	1907	0555	1921	6
7	0720	1811	0715	1832	0655	1846	0627	1856	0604	1908	0555	1921	7
8	0720	1812	0714	1833	0654	1846	0626	1857	0603	1908	0555	1921	8
9	0720	1813	0714	1833	0653	1846	0625	1857	0603	1909	0555	1922	9
10	0720	1813	0713	1834	0653	1847	0624	1857	0602	1909	0555	1922	10
11	0720	1814	0713	1834	0652	1847	0623	1858	0602	1909	0555	1922	11
12	0721	1815	0712	1835	0650	1848	0621	1858	0601	1910	0555	1923	12
13	0721	1815	0712	1835	0650	1848	0621	1858	0601	1910	0555	1923	13
14	0721	1816	0711	1836	0649	1848	0620	1859	0600	1911	0555	1923	14
15	0721	1817	0710	1836	0648	1848	0620	1859	0600	1911	0555	1924	15
16	0721	1818	0710	1837	0647	1849	0619	1859	0559	1912	0555	1924	16
17	0721	1818	0709	1837	0646	1849	0618	1900	0559	1912	0556	1924	17
18	0721	1819	0709	1838	0645	1850	0617	1900	0559	1913	0556	1925	18
19	0721	1820	0708	1838	0644	1850	0616	1900	0558	1913	0556	1925	19
20	0720	1820	0707	1839	0643	1850	0615	1901	0558	1914	0556	1925	20
21	0720	1821	0706	1839	0642	1851	0615	1901	0558	1914	0556	1925	21
22	0720	1822	0706	1840	0641	1851	0614	1902	0557	1914	0557	1925	22
23	0720	1822	0705	1840	0641	1851	0613	1902	0557	1915	0557	1926	23
24	0720	1823	0704	1841	0640	1852	0612	1902	0557	1915	0557	1926	24
25	0720	1824	0703	1841	0639	1852	0612	1903	0557	1916	0557	1926	25
26	0719	1824	0703	1842	0639	1852	0611	1903	0556	1916	0558	1926	26
27	0719	1825	0702	1842	0637	1853	0610	1904	0556.	1917	0558	1926	27
28	0719	1826	0701	1843	0636	1853	0609	1904	0556	1917	0558	1926	28
29	0719	1826	0701	1843	0635	1853	0609	1904	0556	1917	0558	1926	29
30	0718	1827			0634	1854	0609	1904	0555	1918	0559	1927	30
31	0718	1828			0633	1854	0608	1905	0555	1918			31

| Average Twilight Civil: 24 min. Nautical: 51 min. | Average Twilight Civil: 23 min. Nautical: 49 min. | Average Twilight Civil: 22 min. Nautical: 45 min. | Average Twilight Civil: 23 min. Nautical: 50 min. | Average Twilight Civil: 24 min. Nautical: 53 min. | Average Twilight Civil: 25 min. Nautical: 55 min. | |

Retain for use in future years. These data valid through 2020.

TABLE C-4 Sunrise and Sunset for Barking Sands (July-December)

Sunrise, Sunset, and Duration of Twilight for Barking Sands, Kauai, HI
22°02' N. 159°47' W
(July to December)

NOTE: All times are Alaska-Hawaii Standard Time (150th Meridian)

Date	July Sunrise	Sunset	August Sunrise	Sunset	September Sunrise	Sunset	October Sunrise	Sunset	November Sunrise	Sunset	December Sunrise	Sunset	Date
1	0559	1927	0611	1919	0622	1856	0630	1827	0643	1802	0702	1755	1
2	0559	1927	0612	1919	0622	1855	0631	1826	0643	1802	0702	1755	2
3	0600	1927	0612	1918	0623	1854	0631	1825	0644	1801	0703	1755	3
4	0600	1927	0612	1918	0623	1853	0631	1824	0645	1801	0703	1755	4
5	0600	1927	0613	1917	0623	1852	0632	1823	0645	1800	0704	1755	5
6	0601	1927	0613	1916	0623	1851	0632	1822	0646	1800	0705	1756	6
7	0601	1927	0614	1916	0624	1850	0632	1821	0646	1759	0705	1756	7
8	0602	1927	0614	1915	0624	1849	0633	1820	0647	1759	0706	1756	8
9	0602	1926	0614	1914	0624	1848	0633	1819	0647	1758	0707	1756	9
10	0602	1926	0615	1914	0625	1847	0633	1819	0648	1758	0707	1757	10
11	0603	1926	0615	1913	0625	1846	0634	1818	0649	1758	0708	1757	11
12	0603	1926	0616	1912	0625	1845	0634	1817	0649	1757	0709	1757	12
13	0603	1926	0616	1912	0625	1844	0634	1816	0650	1757	0709	1758	13
14	0604	1926	0616	1911	0626	1843	0635	1815	0650	1757	0710	1758	14
15	0604	1926	0617	1910	0626	1842	0635	1814	0651	1756	0710	1758	15
16	0605	1925	0617	1909	0626	1841	0636	1813	0652	1756	0711	1759	16
17	0605	1925	0617	1909	0626	1840	0636	1813	0652	1756	0712	1759	17
18	0606	1925	0618	1908	0627	1839	0636	1812	0653	1756	0712	1800	18
19	0606	1925	0618	1907	0627	1838	0637	1811	0654	1756	0713	1800	19
20	0606	1924	0618	1906	0627	1837	0637	1810	0654	1755	0713	1800	20
21	0607	1924	0619	1905	0628	1836	0638	1810	0655	1755	0714	1801	21
22	0607	1924	0619	1905	0628	1836	0638	1809	0656	1755	0714	1801	22
23	0608	1923	0619	1904	0628	1835	0639	1808	0656	1755	0715	1802	23
24	0608	1923	0620	1903	0628	1834	0639	1807	0657	1755	0715	1803	24
25	0608	1922	0620	1902	0629	1833	0639	1807	0658	1755	0716	1803	25
26	0609	1922	0620	1901	0629	1832	0640	1806	0658	1755	0716	1804	26
27	0609	1922	0621	1900	0629	1831	0640	1805	0659	1755	0716	1804	27
28	0610	1921	0621	1859	0630	1830	0641	1805	0700	1755	0717	1805	28
29	0610	1921	0621	1859	0630	1829	0641	1804	0700	1755	0717	1805	29
30	0610	1920	0621	1858	0630	1828	0642	1803	0701	1755	0718	1806	30
31	0611	1920	0622	1857			0642	1803			0718	1807	31

Average Twilight Civil:	Average Twilight Civil:	Average Twilight Civil:	Average Twilight Civil:	Average Twilight Civil:	Average Twilight Civil:
23 min.	23 min.	22 min.	23 min.	24 min.	24 min.
Nautical:	Nautical:	Nautical:	Nautical:	Nautical:	Nautical:
54 min.	50 min.	48 min.	49 min.	51 min.	52 min.

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